BOARD OF SUPERVISORS INDEX SHEET

Creation Date: 10/16/13
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Resolution(s):

Ordinance(s):

Contract(s):

Continue Date(s):

Index: -- Letter of County Counsel
-- Letter of the Planning Director
-- Proposed ordinance

SANTA CRUZ COUNTY
BOARD OF SUPERVISORS INDEX SHEET

Item: 46. CONSIDERED a proposed ordinance deleting Chapter 7.124, deleting Section 13.10.670, amending the Commercial Uses Chart and the Definitions of the Zoning Ordinance, and enacting new Santa Cruz County Code Chapter 7.124, and approving a categorical exemption, all relating to Medical Marijuana, and took related action;
(1) Motion made by Supervisor McPherson directing County Counsel to return on October 29, 2013, with a draft ordinance that models Mendocino County's language with regard to cultivation but retains the elements with regard to dispensaries that County Counsel has presented with the following additions: 1) the language in (A) would be replaced with "Every Medical Marijuana business is prohibited that has not obtained a Seller's Permit from the State Board of Equalization by 180 days after the implementation date of this ordinance, excluding any medical marijuana business that opened during the County's moratorium"; in (M), allow for dispensaries to be listed on third party websites; in section (p)(2)(a), add "and phone number" after "name" and delete subsection (P)(2)(b); in (d), add "any person selling marijuana in a dispensary must be 21 years of age or older"; the implementation date shall be January 1, 2014; and with the following additional directions: the County convene a Medical Marijuana Ad Hoc Task Force immediately with its purpose being to monitor the implementation of the ordinance with regard to supply, study cultivation impacts on the environment and neighborhoods, and to make recommendations for possible modifications to the ordinance in the future; and direct Planning staff to explore funding mechanisms and revenue measures associated with medical marijuana and report back during 2014-2015 budget hearings with any funding or revenue measures and a complete budget for enforcement of the medical marijuana ordinance based on experience gained during 2013-2014; MOTION FAILED due to lack of a second
2) Motion by Supervisor Leopold, seconded by Supervisor McPherson, with Supervisors Caput and Friend voting no, the Board, directed County Counsel to return October 29, 2013 with a draft ordinance that excludes the Mendocino County ordinance language and cultivation elements, but includes the following: the language in (A) would be replaced with "Every Medical Marijuana business is prohibited that has not obtained a Seller's Permit from the State Board of Equalization by 180 days after the implementation date of this ordinance, excluding any medical marijuana business that opened during the County's moratorium"; in (M), allow for dispensaries to be listed on third party websites; in Section (p)(2)(a), add "and phone number" after "name" and delete subsection (P)(2)(b); in (d), add "any person selling marijuana in a dispensary must be 21 years of age or older"; the implementation date shall be January 1, 2014; adding the language, "No person shall print, publish, advertise, or disseminate in any way or means of communication, or cause to be printed, published, advertised or disseminated in any way or means of communication, including, but not limited to the use of the internet, and notice or advertisement with respect to either seeking or offering the availability if space to cultivate marijuana, regardless of whether the space is within a structure or outdoors"; and with the following additional directions to staff: the County convene a Medical Marijuana Ad Hoc Task Force immediately, with representatives from the Agricultural Commissioner' office, the UCSC Center for Agricology and Sustainable Food System, the Farm Bureau, the WO/Man's Alliance for Medical Marijuana, the Association of Standardized Cannabis, and Dr. Arnold Leff, with its purpose being to monitor the implementation of the ordinance with regard to supply, study cultivation impacts on the environment and neighborhoods, and to make recommendations for possible modifications to the ordinance in the future; and direct Planning staff to

disseminated in any way or means of communication, including, but not limited to the use of the internet, and notice or advertisement with respect to either seeking or offering the availability if space to cultivate marijuana, regardless of whether the space is within a structure or outdoors"; and with the following additional directions to staff: the County convene a Medical Marijuana Ad Hoc Task Force immediately, with representatives from the Agricultural Commissioner' office, the UCSC Center for Agricology and Sustainable Food System, the Farm Bureau, the WO/Man's Alliance for Medical Marijuana, the Association of Standardized Cannabis, and Dr. Arnold Leff, with its purpose being to monitor the implementation of the ordinance with regard to supply, study cultivation impacts on the environment and neighborhoods, and to make recommendations for possible modifications to the ordinance in the future; and direct Planning staff to explore funding mechanisms and revenue measures associated with medical

SANTA CRUZ COUNTY
BOARD OF SUPERVISORS INDEX SHEET

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marijuana and report back during 2014-2015 budget hearings with any funding or revenue measures and a complete budget for enforcement of the medical marijuana ordinance based on experience gained during 2013-2014

COUNTY OF SANTA CRUZ

0391

OFFICE OF THE COUNTY COUNSEL

701 OCEAN STREET, SUITE 505, SANTA CRUZ, CA 95060-4068 (831) 454-2040 FAX: (831) 454-2115

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Special Counsel

Dwight L. Herr

October 16, 2013

Agenda Date: October 22, 2013

Board of Supervisors
County of Santa Cruz
701 Ocean Street, Room 500
Santa Cruz, California 95060

Re: Consider Proposed Ordinance Deleting Chapter 7.124, Deleting Section 13.10.670, Amending the Commercial Uses Chart and the Definitions of the Zoning Ordinance and enacting new Chapter 7.124 all relating to Medical Marijuana

Dear Members of the Board:

On September 24, 2013, your Board considered a draft ordinance banning marijuana business and cultivation activities, but then providing a limited immunity from prosecution for limited types of activity. Your Board conducted a public hearing and then directed County Counsel to return with specific revisions to the proposed ordinance.

The attached "marked" version of the ordinance identifies additions and deletions from the draft ordinance considered at your prior meeting. The changes directed by your Board include the following:

1. Fixes the allowed operating hours for dispensaries to 8:00 a.m. to 10:00 p.m. (see Subdivision (B) of Section 7.124.040.)

2. Applies the requirement for an annual LiveScan background check to the persons with directing and ownership interests in a dispensary rather than a dispensary manager, and excludes certain marijuana-related convictions as the basis for a failed check (see Subdivision (H) of Section 7.124.040.)

3. Deletes the prohibition against locating a dispensary within six hundred feet of a park.

4. Revises the requirement that dispensaries collect certain information from cultivators. Persons cultivating *indoors* would be required to document building code compliance based on the cultivation methods employed. The dispensary would be required to inspect and verify this documentation at least annually.

Outdoor cultivators would be required to identify the location of the grow site, and if the location was owned by another party, confirm that there was no objection to the use of the land. The dispensary would be required to contact the owner and confirm the information (see Subdivision (P) of Section 7.124.040.)

5. Revises the cultivation requirements. Cultivation within a residential zone district would be allowed within a non-habitable structure, or if one was not available, within a residence, subject to a one hundred square foot garden canopy limit per parcel. Outdoor cultivation would remain prohibited within a residential zone district.

Outside of a residential zone district, indoor or outdoor cultivation would be allowed subject to a three hundred square foot garden canopy limit per parcel. Indoor cultivation would be limited to non-habitable structures and could not be located within three hundred feet of an occupied dwelling. Outdoor cultivation would be subject to the County's Environmental and Resource Protection regulations. Parcels larger than three acres in size would be allowed up to one thousand square feet of garden canopy per parcel (see Section 7.124.070.)

6. The existing County Code provisions related to medical marijuana identification cards and personal possession limits were added (see Section 7.124.080.)

CEQA Determination

Planning staff have determined that the proposed ordinance will not result in a direct or reasonably foreseeable indirect physical change in the environment, pursuant to CEQA Guidelines Section 15060(c)(2) based on a determination that the ordinance would restrict medical marijuana businesses consistent with existing legal authority. Because the existing baseline of conditions is that medical marijuana businesses and cultivation are not legally authorized uses under the County's zoning ordinance and the proposed ordinance would specifically ban such businesses and cultivation, the proposed ordinance would result in no direct or reasonably foreseeable indirect physical change or impact upon the environment. In addition, the proposed ordinance is exempted under CEQA Guidelines Section 15308 as it is an action taken by a regulatory agency to enhance the environment by prohibiting rather than authorizing medical marijuana businesses and cultivation.

IT IS THEREFORE RECOMMENDED that your Board take the following actions:

1. Approve the categorical exemption; and

2. Adopt in concept the attached ordinance deleting then reenacting Chapter 7.124 and making other conforming changes to the Santa Cruz County Code all relating to Medical Marijuana; and

3. Direct the Clerk of the Board to place the ordinance on the next available agenda for final consideration and action by the Board.

Very truly yours,

DANA MCRAE, COUNTY COUNSEL

By _____
Rahn Garcia
Chief Deputy County Counsel

Attachments: Ordinance (Marked and Clean versions)
Categorical Exemption

RECOMMENDED:

_____
SUSAN A. MAURIELLO
County Administrative Officer

COUNTY OF SANTA CRUZ

PLANNING DEPARTMENT
701 OCEAN STREET, 4TH FLOOR, SANTA CRUZ, CA 95060
(831) 454-2580 FAX: (831) 454-2131 TDD: (831) 454-2123
KATHLEEN MOLLOY PREVISICH, PLANNING DIRECTOR

October 15, 2013

AGENDA DATE: October 22, 2013

Board of Supervisors
County of Santa Cruz
701 Ocean Street
Santa Cruz, CA 95060

CONSIDERATIONS RELATED TO IMPLEMENTATION OF MEDICAL MARIJUANA ORDINANCE

Members of the Board:

At the conclusion of the Board's discussion of a proposed Medical Marijuana Ordinance on September 24th, staff was directed to provide information to the Board about potential costs and funding sources related to enforcement of the new ordinance.

In order to provide context for a discussion of resources available to enforce the ordinance, it is helpful to review the current level of Code Compliance Section staffing and activity. Presently, there are three full-time equivalent Code Compliance Investigators employed in the Planning Department, who pursue a wide range of zoning, building, environmental and nuisance complaints. About 900 new complaints are made each year by members of the public, resulting in about 2,700 inspections in the field each year by the Investigators. On average, about 240 cases per year are resolved. Lower priority cases are addressed by sending out a letter to the property owner regarding the alleged violation, with no follow-up by staff. Code Compliance staff are then able to focus efforts on the highest priority violations, such as possible violations which are threats to life/safety, environmental degradation, and other egregious violations of County land use codes. The relatively low rate of resolution of cases, and the length of time that it can take to resolve a case are reflective of current staffing levels.

It has become apparent to code compliance staff that the number of cases that involve marijuana has been increasing in recent years. Staff estimates that from 15% to 20% of the current code compliance workload is related to marijuana related issues. There have been more complaints about indoor grow houses, which involve electrical, plumbing, mechanical/exhaust and structural violations, in addition to generating strong odors and increasing the possibility of criminal activity at these sites. There has also been a significant increase in the number of cases involving unpermitted grading, which has included the destruction of sensitive habitat and riparian areas and erosion which leads to water quality impacts, or impacts to neighboring properties. Federal, State, regional and local agencies involved with protection of natural resources have been concerned about these impacts, and would encourage additional efforts to address illegal grading and biotic impacts, whether or not the unpermitted grading is related to medical marijuana cultivation.

Considerations involved with staffing efforts to implement the ordinance include:

- What is the appropriate level of enforcement? Certainly the County would want to be able to effectively respond to complaints. In addition, we would want to focus on known areas where grading and other practices involve significant threats to the environment, and any dispensaries that may not be operating in a manner consistent with the ordinance adopted by the Board.

- Staff from Butte County, Humboldt County and Nevada County indicate that the investigation of and elimination of marijuana related violations require dedicated staff that have specialized training and knowledge of marijuana laws and issues. Several counties have established task forces with staff participating from public safety and land use departments to craft an appropriate enforcement response.

- The Sheriff's Office has expressed a willingness to accompany and coordinate with code compliance staff as requested; however, having code compliance personnel with some level of natural resource and public safety experience could also be beneficial.

- A good portion of the marijuana cultivation activity which is having environmental impact is taking place in difficult to access areas. The Planning Department does not have a 4WD vehicle, and staff will need to work with Fleet Services and the Sheriff to address the need for remote access.

- Although Planning would like to establish a fee basis to support the compliance effort, we are informed by County Counsel that fee approaches may be problematic. Planning staff would like to work with Counsel to address the possibility of developing appropriate approaches to offset the costs incurred in the implementation of the ordinance. Other funding mechanisms or revenue measures associated with medical marijuana may also be available. These could include a sales tax measure, as was put on the ballot in San Jose, or the sale of "zip ties" which are affixed to crops, as is practiced in other jurisdictions. All of these revenue mechanisms require further evaluation.

- Experience with implementation of the ordinance will enable a more informed discussion in the future about the level of resources needed to staff the appropriate level of enforcement. It is possible that State or federal law could change in the future in a manner that would change the County's response.

Although it is difficult to project the required level of enforcement and thereby accurately estimate the County's costs for enforcement, a Code Investigator III, including benefits, costs about $115,000 annually. If a new vehicle is required, that cost would total approximately $30,000. There will be costs in the Sheriff's department to support the efforts of Code Compliance staff. Depending on the nature of the deployments, annual costs in the Sheriff's Office could exceed $20,000.

In order to provide for the effective implementation of the ordinance, address the significant issues of environmental degradation, and work with Counsel to address compliance by the dispensaries, we are planning to hire staff on an extra help basis, and to prepare a complete budget request in conjunction with the next budget cycle.

It is therefore RECOMMENDED that your Board take the following actions:

1. Direct staff to explore funding mechanisms and revenue measures associated with medical marijuana and report back to the Board at an appropriate time with any funding or revenue measures that could be considered by the Board; and,

2. Direct Planning to return at 2014-15 Budget Hearings with a complete budget for the enforcement of the Medical Marijuana Ordinance based on the experience gained during 2013-14.

Sincerely,

Kathy M Previsich

KATHY M. PREVISICH
Planning Director

RECOMMENDED:

Susan A. Mauriello CAK

SUSAN A. MAURIELLO
County Administrative Officer

Copy to: County Counsel

ORDINANCE NO. _____

ORDINANCE DELETING EXISTING CHAPTER 7.124 OF THE SANTA CRUZ COUNTY CODE REGARDING MEDICAL MARIJUANA; DELETING EXISTING 13.10.670; AMENDING THE COMMERCIAL USES CHART IN SUBDIVISION (B) OF SECTION 13.10.332 BY DELETING THE REFERENCE TO "MEDICAL MARIJUANA COOPERATIVES"; DELETING THE REFERENCE TO "MEDICAL MARIJUANA COOPERATIVES" IN 13.10.700-M.; AND ADDING NEW CHAPTER 7.124 ALL RELATING TO MEDICAL MARIJUANA

The Board of Supervisors of Santa Cruz County hereby finds and declares the following:

WHEREAS, in 1992 the voters of the County of Santa Cruz enacted Measure "A", adding Chapter 7.122 to the Santa Cruz County Code which declared support for making marijuana available for medical use; and

WHEREAS, in 1996, the voters of the State of California approved Proposition 215 (codified as California Health and Safety Code section 11362.5, and entitled "The Compassionate Use Act of 1996").

WHEREAS, the intent of Proposition 215 was to enable persons who are in need of marijuana for medical purposes to use it without fear of criminal prosecution under limited, specified circumstances. The proposition further provides that "nothing in this section shall be construed to supersede legislation prohibiting persons from engaging in conduct that endangers others, or to condone the diversion of marijuana for non-medical purposes." The ballot arguments supporting Proposition 215 expressly acknowledged that "Proposition 215 does not allow unlimited quantities of marijuana to be grown anywhere"; and

WHEREAS, the Board of Supervisors added Chapter 7.124 to the Santa Cruz County Code which implemented provisions of Proposition 215 by establishing a medical marijuana identification card program operated by the County; and

WHEREAS, in 2004, the Legislature enacted Senate Bill 420 (codified as California Health and Safety Code sections 11362.7 et seq.) to clarify the scope of Proposition 215, and to provide qualifying patients and primary caregivers who collectively or cooperatively cultivate marijuana for medical purposes with a limited defense to certain specified State criminal statutes; and

WHEREAS, Health and Safety Code section 11362.83 expressly allows cities and counties to adopt and enforce ordinances that are consistent with Senate Bill 420; and

WHEREAS, following enactment of Senate Bill 420, Chapter 7.124 was amended to establish local guidelines consistent with the new State law for the possession and cultivation of medical marijuana used by qualified patients and care givers; and

WHEREAS, the federal Controlled Substances Act, 21 U.S.C. §§ 801 et seq., classifies marijuana as a Schedule I Drug, which is defined as a drug or other substance that has a high

potential for abuse, that has no currently accepted medical use in treatment in the United States, and that has not been accepted as safe for use under medical supervision. The Federal Controlled Substances Act makes it unlawful, under federal law, for any person to cultivate, manufacture, distribute or dispense, or possess with intent to manufacture, distribute or dispense, marijuana. The Federal Controlled Substances Act contains no exemption for the cultivation, manufacture, distribution, dispensation, or possession of marijuana for medical purposes; and

WHEREAS, the ~~county's~~ County's unique geographic and climatic conditions, which includes dense forested areas receiving substantial precipitation, provide conditions that are favorable to marijuana cultivation; and

WHEREAS, Proposition 215 and Senate Bill 420 primarily address the criminal law, providing qualifying patients and primary caregivers with limited immunity from state criminal prosecution under certain identified statutes. Neither Proposition 215, Senate Bill 420, the relevant provisions of the Santa Cruz County Code, nor the Attorney General's August 2008 Guidelines for the Security and Non-Diversion of Marijuana Grown for Medical Use adopted pursuant to Senate Bill 420, provide comprehensive civil regulation of premises used for marijuana cultivation. The unregulated cultivation of marijuana in the unincorporated area of Santa Cruz County can adversely affect the health, safety, and well-being of the county and its residents. Comprehensive civil regulation of premises used for marijuana cultivation is proper and necessary to avoid the risks of criminal activity, degradation of the natural environment, obnoxious smells, and indoor electrical fire hazards that may result from unregulated marijuana cultivation, and ~~that~~ are especially significant if the amount of marijuana cultivated at a location is not regulated and substantial amounts of marijuana are thereby allowed to be concentrated in one place; and

WHEREAS, on May 6, 2013, the California Supreme Court unanimously ruled in *City of Riverside v. Inland Empire Patients Health and Wellness Center, Inc.* ("*Inland Empire*"), that California's medical marijuana laws do not preempt local ordinances that ban medical marijuana facilities. The Court found that the local police power derived from Article XI, section 7, of the California Constitution includes broad authority to determine, for purposes of public health, safety, and welfare, the appropriate uses of land within a local jurisdiction's borders, and that "[n]othing in the CUA or the MMP expressly or impliedly limits the inherent authority of a local jurisdiction, by its own ordinances, to regulate the use of its land, including the authority to provide that facilities for the distribution of medical marijuana will not be permitted to operate within its borders"; and

WHEREAS, cultivation of any amount of marijuana at locations or premises within six hundred feet of a school ~~or public park which includes playground apparatus,~~ creates unique risks that the marijuana plants may be observed by juveniles, and therefore be especially vulnerable to theft or recreational consumption by juveniles. Further, the potential for criminal activities associated with marijuana cultivation in such locations poses heightened risks that juveniles will be involved or endangered. Therefore, cultivation of any amount of marijuana in such locations or premises is especially hazardous to public safety and welfare, and to the protection of children and the person(s) cultivating the marijuana plants; and

WHEREAS, as recognized by the Attorney General's August 2008 Guidelines for the Security and Non-Diversion of marijuana grown for medical use, the cultivation or other

concentration of marijuana in any location or premises without adequate security increases the risk that surrounding homes or businesses may be negatively impacted by nuisance activity such as loitering or crime; and

WHEREAS, it is the purpose and intent of this chapter to implement state law by providing a means for regulating the cultivation of medical marijuana in a manner that is consistent with state law and which balances the needs of medical patients and their caregivers and promotes the health, safety, and welfare of the residents and businesses within the unincorporated territory of Santa Cruz County. This chapter is intended to be consistent with Proposition 215 and Senate Bill 420, and towards that end, is not intended to prohibit persons from individually, collectively, or cooperatively exercising any right otherwise granted by state law. Rather, the intent and purpose of this chapter is to establish reasonable regulations upon the manner in which marijuana may be cultivated, including restrictions on the amount of marijuana that may be individually, collectively, or cooperatively cultivated in any location or premises, in order to protect the public health, safety, and welfare in Santa Cruz County; and

WHEREAS, the limited right of qualified patients and their primary caregivers under state law to cultivate marijuana plants for medical purposes does not confer the right to create or maintain a public nuisance. By adopting the regulations contained in this chapter, Santa Cruz County will achieve a significant reduction in the aforementioned harms caused or threatened by the unregulated cultivation of marijuana in the unincorporated area of the County; and

WHEREAS, nothing in this ordinance shall be construed to allow the use of marijuana for non-medical purposes, or allow any activity relating to the cultivation, distribution, or consumption of marijuana that is otherwise illegal under state or federal law. No provision of this chapter shall be deemed a defense or immunity to any action brought against any person by the Santa Cruz County District Attorney, the Attorney General of the State of California, or the United States of America.

NOW THEREFORE the Board of Supervisors of the County of Santa Cruz ordains as follows:

SECTION I

The Santa Cruz County Code is hereby amended by deleting Chapter 7.124 in its entirety.

SECTION II

The Santa Cruz County Code is hereby amended by adding new Chapter 7.124 to read as follows:

Chapter 7.124
Medical Marijuana

Sections:

7.124.010 Purpose.

The purpose of this Chapter is to prohibit medical marijuana businesses and cultivation while granting limited immunity from the enforcement of its prohibition to those medical marijuana businesses and cultivation activities that do not violate the restrictions and limitations set forth in this ~~chapter~~Chapter.

It is also the purpose of this Chapter to mitigate the negative impacts and secondary effects associated with ongoing medical marijuana businesses and cultivation activity, including but not limited to demands placed on law enforcement and administrative resources; neighborhood disruption; the exposure of children to medical marijuana; drug sales to minors and adults; fraud in issuing, obtaining or using medical marijuana recommendations; robberies, burglaries, assaults, drug trafficking and other violent crimes; and the damage to the natural environment resulting from destructive cultivation activity.

This Chapter is not intended to conflict with federal or State law. It is the intention of the County that this Chapter be interpreted to be compatible with federal and state enactments and in furtherance of the public purposes that those enactments encompass.

7.124.020 Definitions.

As used in this Chapter, the following words and phrases shall have the meanings respectively ascribed to them by this section:

(A) "Building" means any structure having a roof supported by columns or walls, for the housing, shelter or enclosure of persons, animals, chattels, or property of any kind.

(B) "Cultivation" or "Cultivate" means the planting, growing, harvesting, drying, processing or storage of one or more marijuana plants or any part thereof in any location, indoor or outdoor, including within a fully enclosed and secure building.

(C) "Enforcing Officer" means the Planning Director or any other peace officer, public official or employee duly authorized to enforce against violations of the County Code.

(D) "Fence" means a wall or barrier connected by boards, masonry, rails, panels or any other materials for the purpose of enclosing space or separating parcels of land. For purposes of this Chapter, the term "Fence" does not include tarpaulins, scrap material, bushes or hedgerows.

(E) "Hazardous Materials" means any substance that is "flammable, reactive, corrosive or toxic", as further defined in California Health and Safety Code Sections 25501 and 25503.5, as may be amended.

(F) "Location" or "Parcel" means that unit of land assigned a unique Assessor's Parcel Number by the County Assessor, whether vacant or occupied by a building, group of buildings, or accessory buildings, and includes the buildings, structures, yards, open spaces, lot width, and lot area.

(G) "Manager" means any person to whom a medical marijuana business has delegated discretionary powers to organize, direct, carry on or control its operations. Authority to control one or more of the following functions shall be prima facie evidence that such a person is a manager of the business: (1) to hire, select, direct, schedule or assign employees or staff, including volunteers; (2) to acquire facilities, furniture, equipment or supplies other than the occasional replenishment of stock; (3) to disburse funds of the business other than for the receipt of regularly replaced items of stock; or (4) to make, or participate in making, policy decisions relative to operations of the business.

(H) "Marijuana" shall be construed as defined in California Health and Safety Code Section 11018 and further shall specifically include any product that contains marijuana or a derivative of marijuana.

(I) "Marijuana plant" means any mature or immature marijuana plant, or any marijuana seedling, unless otherwise specifically provided herein.

(J) "Medical marijuana business" means either of the following:

(1) Any location where marijuana is distributed, delivered, dispensed, sold or given away to a qualified patient, a person with an identification card, or a primary caregiver.

(2) Any vehicle or other mode of transportation, stationary or mobile, which is used to transport, distribute, deliver, dispense, or give away marijuana to a qualified patient, a person with an identification card, or a primary caregiver.

(3) Notwithstanding Subparagraphs (1) and (2) above, "medical marijuana business" shall not include any of the following:

(a) A residence or dwelling unit where the requirements of Subdivision (A) of Section 7.124.070 are met;

(b) Any location during only that time reasonably required for a primary caregiver to distribute, deliver, dispense or give away marijuana to a qualified patient or person with an identification card who has designated the individual as a primary caregiver, for the personal medical use of the qualified patient or person with an identification card, in accordance with California Health and Safety Code Section 11362.5 and 11362.7 *et seq.;*

(c) The location of any clinic licensed pursuant to Chapter 1 (commencing with Section 1200), a health care facility licensed pursuant to Chapter 2 (commencing with Section 1250), a residential care facility for persons with chronic life-threatening illness licensed pursuant to Chapter 3.01 (commencing with Section 1568.01), a residential care facility for the elderly licensed pursuant to Chapter 3.2 (commencing with Section 1569), a hospice, or a home health agency licensed pursuant to Chapter 8 (commencing with Section 1725), all of Division 2 of the California Health and Safety Code where: (i) a qualified patient or person with an identification card receives medical care or supportive services, or both, from the clinic, facility, hospice, or home health agency, and (ii) the owner or operator, or one of not more than three employees designated by the owner or operator, of the clinic, facility, hospice, or home health agency has been designated as a

primary caregiver pursuant to California Health and Safety Code Section 11362.7(d) by that qualified patient or person with an identification card; or

(d) Any vehicle during only that time reasonably required for its use by: (i) a qualified patient or person with an identification card to transport marijuana for his or her personal medical use, or (ii) a primary caregiver to transport, distribute, deliver, dispense, or give marijuana to a qualified patient or person with an identification card who has designated the individual as a primary caregiver, for the personal medical use of the qualified patient or person with an identification card, in accordance with California Health and Safety Code Section 11362.765.

(K) "Outdoor" or "Outdoors" means any location that is not "indoors" within a fully enclosed and secure structure as defined herein.

(L) "Residence" means a fully enclosed structure, including any attached garage or ancillary structure, used as the primary dwelling unit of a "Person with an identification card"; "Primary caregiver"; or "Qualified patient".

(M) "Residential zone district" means a zone district designated as RR, R-1, RB or RM by the Santa Cruz County Zoning Ordinance.

(~~M~~N) "School" means any licensed preschool or any public or private school providing instruction in kindergarten or grades 1 to 12, inclusive, but does not include any private school in which education is primarily conducted in private homes.

(~~N~~O) "Structure" means anything constructed or erected which is supported directly or indirectly on the earth, but not including any vehicle.

(~~O~~P) "Vehicle" means a device by which any person or property may be propelled, moved, or drawn upon a street, sidewalk or waterway, including but not limited to a device moved exclusively by human power.

(~~P~~bQ) The following words or phrases when used in this Section shall be construed as defined in California Health and Safety Code Sections 1746,11362.5, 11362.7, and 11834.02. "Alcoholism or drug abuse recovery or treatment facility"; "Hospice"; "Identification card"; "Person with an identification card"; "Primary caregiver"; and "Qualified patient".

7.124.030 Prohibited business activities.

(A) It is unlawful and shall constitute a public nuisance to own, establish, operate, use, or permit the establishment or operation of a medical marijuana business, or to participate as an employee, contractor, agent or volunteer, or in any other manner or capacity in any medical marijuana business.

(B) The prohibition in Subsection (A), above, includes renting, leasing, or otherwise permitting a medical marijuana business to occupy or use a location, vehicle, or other mode of transportation.

7.124.040 Limited immunity for medical marijuana business.

Notwithstanding the activities prohibited by Section 7.124.030, and notwithstanding that medical marijuana business is not and shall not become a permitted use in the County for so long as this Chapter remains in effect, a medical marijuana business shall not be subject to the enforcement remedies set forth in the Santa Cruz County Code solely on the basis of: (1) an activity prohibited by Section 7.124.030; and (2) the fact that medical marijuana business is not a permitted use in the County, provided however that, as authorized by California Health and Safety Code Section 11362.83, this limited immunity is available and may be asserted as an affirmative defense only so long as: (a) subsections (A) through (P) of this Section 7.124.040 remain in effect in their entirety; (b) it is asserted by a medical marijuana business at the one location identified in its original or any amended seller permit issued by the State Board of Equalization; and (c) ~~only if that~~the medical marijuana business does not violate any of the following:

(A) Every medical marijuana business is prohibited that was not operating within the County of Santa Cruz as a medical marijuana business with a valid Seller's Permit issued by the State Board of Equalization before January 1, 2012, and maintains said permit without interruption;

(B) Every medical marijuana business is prohibited that remains open and/or operating between the hours of 8~~1~~08:00 p.m. and 8~~1~~0:00 a.m.;

(C) Every medical marijuana business is prohibited where marijuana and/or alcohol are consumed at the premises including any area used for parking any vehicle;

(D) Every medical marijuana business is prohibited that allows a minor unaccompanied by a parent or legal guardian to enter its premises;

(E) Every medical marijuana business is prohibited where marijuana is visible from the exterior of the premises;

(F) Every medical marijuana business is prohibited that illuminates any portion of its premises between the hours of 8:00 p.m. and 10:00 a.m. by lighting that is visible from the exterior of the premises, except such lighting as is reasonably utilized for the security of the premises;

(G) Every medical marijuana business is prohibited unless it is located in a zone district designated as PA (Professional and Administrative Offices), C-1 (Neighborhood Commercial), C-2 (Community Commercial), C-4 (Commercial Services), or C-T (Tourist Commercial) by the Santa Cruz County Zoning Ordinance. This subsection shall not apply to defeat the limited immunity claim of a medical marijuana business that is otherwise entitled to assert said claim of immunity if it moves within one hundred eighty (180) days after the effective date of this Chapter to a location that does not violate this subsection;

~~(H) Every medical marijuana business is prohibited that fails to identify by name and residence address each owner or member of its Board of Directors of its Managers to the County Planning Department by October 31st of each year and whose Managers owner or Director fails to successfully pass and publicly display at the location of the medical marijuana business the~~

~~results of an notify the Planning Department of any failure to pass an annual LiveScan background check to be completed by January 31st of each year. A failed LiveScan is a LiveScan that includes any drug-related felony conviction within the past ten years and/or current parole or probation for the sale or distribution of a controlled substance, but not including a felony conviction for a marijuana-related offense unless that particular offense involves sales to a minor;~~

(H) Every medical marijuana business is prohibited where one or more members of its ownership interest have failed an annual LiveScan background check. The LiveScan background check shall be completed by January 31st of each year. The results of each LiveScan check conducted shall be maintained in the offices of the business for a period of at least three (3) years, and made available for review upon the request of any enforcing officer.

(1) "Ownership interest" for the purposes of this subsection shall mean any person with an ownership interest in the business of more than ten (10%) percent, or if incorporated, a directing role, including, but not limited to:

(a) A sole proprietor;

(b) A general or limited partner;

(c) A member of the board of directors;

(d) A corporate officer.

(2) A failed LiveScan is a LiveScan that includes any drug-related felony conviction within the past ten years and/or current parole or probation for the sale or distribution of a controlled substance, but not including a felony conviction for a marijuana-related offense unless that particular offense involved sales to a minor.

(I) Every medical marijuana business is prohibited that has one or more Managers who are also Managers at the same time of another medical marijuana business in the County;

(J) Every medical marijuana business is prohibited that provides an on-site location for physicians or medical professionals to write recommendations;

(K) Every medical marijuana business is prohibited that does not provide litter and graffiti removal services for the business premises on a daily basis;

(L) Every medical marijuana business is prohibited that does not provide dedicated security personnel during its hours of operation;

(M) ~~Every medical marijuana business is prohibited that advertizes the sale of marijuana in any medium, except for: (1) an entry in the telephone directory with the name, location and phone number of the business; (2) signage as permitted by this Section 7.124.040; or (3) a website with the name, location and phone number of the business. Such web sites shall not include the display of a sales price for any marijuana product that is dispensed by the business except on a password required portal that may only be accessed by cooperative or collective members of the business.~~ Every medical marijuana business is prohibited that prints, publishes, advertises or disseminates in any way or by any means of communication, or causes to be

printed, published, advertised or disseminated in any way or by any means of communication, including, but not limited to the use of the internet, any notice or advertisement that mentions or refers to the distribution, delivery, dispensing, sale, or giving away of marijuana.

Notwithstanding the limitations imposed by this subdivision (M), a medical marijuana business may provide the following: (a) an entry in the telephone directory with the name, location and phone number of the business; (b) signage as permitted by Section 7.124.040; or (c) a website with the name, location and phone number of the business. Such directory entry or web site may identify the business as a "medical marijuana dispensary", but shall not include the display of sales prices for any product, except on a password required portal that may only be accessed by cooperative or collective members of the business.

(N) Every medical marijuana business is prohibited that provides signage for the business other than one identifying sign stating the business name, address and hours of operation ~~not to exceed four square feet in area~~; such signs shall not exceed four square feet in area, shall not be directly illuminated, and shall not contain graphics identifying marijuana.

(O) Every medical marijuana business is prohibited that is located within: (1) six hundred (600) feet from a school; ~~(2) six hundred (600) feet from a public park which includes children playground apparatus;~~ or (~~3~~2) six hundred (600) feet from another medical marijuana business. The distance specified in this paragraph shall be the horizontal distance measured in a straight line from the property line of the school~~, public park~~ or other medical marijuana business, to the closest property line of the lot on which the medical marijuana business is located without regard to intervening structures. In the event that two or more medical marijuana businesses are located within six hundred (600) feet of one another, only the medical marijuana business with the earliest issuance date on a State Board of Equalization seller's permit for its operation at the location may assert the limited immunity provided by this Chapter. The distance requirements set forth in this subsection shall not apply to: (i) those licensed health care and other facilities identified in California Health and Safety Code Section 11362.7(d)(1); (ii) defeat the limited immunity claim of a medical marijuana business that is otherwise entitled to assert the limited immunity provided by this Chapter if it moves within 180 days after the effective date of this Chapter to a location that does not violate the distance requirements; and (iii) a medical marijuana business that is in violation of the distance requirement of this subsection as a result of the establishment of a conflicting use (a school~~, public park~~ or other medical marijuana business) after the date on which the State Board of Equalization issued a seller permit to the medical marijuana business for its location.

~~(P) Every medical marijuana business is prohibited that fails to obtain from each person supplying marijuana being offered for sale, distribution, gift or delivery by the business, the following information concerning the location of where the marijuana cultivation took place and thereafter makes said information immediately available upon the request of any law enforcement officer or enforcing officer: (1) the name of the person supplying the marijuana; (2) the address of the location at which the marijuana being supplied is cultivated; (3) written documentation from the owner of the property where the marijuana cultivation takes place that he or she has agreed to the use of the site for cultivation; and (4) if the marijuana is being cultivated indoors, a written certification from a licensed electrician that the cultivation location~~

~~has all necessary electrical permits required by the California Building Codes to ensure that the growing operations can be carried out safely.~~

(P) Every medical marijuana business is prohibited that fails to obtain the information required by subsections (1) or (2) of this subdivision (P). The information collected shall be maintained in the offices of the business for a period of at least one (1) year, and made available for review upon the request of any enforcing officer:

(1) If the marijuana was grown at a site described by subdivision (A) of section 7.124.070, documentation from the marijuana cultivator that the residence or structure where cultivation takes place is in compliance with the building code requirements applicable to the cultivation methods employed. The medical marijuana business shall employ a licensed contractor to conduct at least one site inspection each year to verify the documentation provided by the cultivator.

(2) If the marijuana was grown at a site described by subdivisions (B) or (C) of section 7.124.070, the following information:

(a) The name of the person cultivating the marijuana.

(b) The address of the location at which the marijuana is cultivated.

(c) If the cultivator does not own the property where the marijuana cultivation takes place, the name and phone number of the property owner. The medical marijuana business shall contact the property owner and confirm that the property owner does not object to use of the property for cultivation.

(d) If any indoor cultivation takes place on the property, documentation from the marijuana cultivator that the structure where cultivation takes place is in compliance with the building code requirements to the cultivation methods employed. The medical marijuana business shall employ a licensed contractor to conduct at least one site inspection each year to verify the documentation provided by the cultivator.

The limited immunity provided by this Section shall not be available to and shall not be asserted as an affirmative defense to any violation of law except as expressly set forth in this Chapter. Further, nothing contained in this limited immunity is intended to provide or shall be asserted as a defense to a claim for violation of law brought by any county, state, or federal governmental authority. Finally, the limited immunity provided by this Section shall be available and may be asserted only so long as each and every provision and clause of subsections (A) through (P) and of this Section 7.124.040 remain valid, effective and operative.

7.124.050 No vested or nonconforming rights.

(A) This Chapter prohibits medical marijuana businesses. Neither this Chapter, nor any other provision of this Code or action, failure to act, statement, representation, certificate, approval, or permit issued by the County or its departments, or their respective representatives, agents, employees, attorneys or assigns, shall create, confer, or convey any vested or nonconforming right or benefit regarding any medical marijuana business. Any immunity or benefit conferred by this Chapter shall expire permanently and in full upon repeal of this Chapter.

(B) All existing medical marijuana businesses must immediately cease operation; except that any medical marijuana business that that does not violate any of the medical marijuana business prohibitions described in Section 7.124.040, Limited Immunity, may continue to operate but only so long as subsections (A) through (P) of Section 7.124.040 remain valid, effective and operative.

7.124.060 Prohibited cultivation activities.

(A) The cultivation of marijuana, either indoors or outdoors, at any location in an amount or quantity greater than as provided herein, or in any other way not in conformance with or in violation of any provision of ~~this~~ Section 7.124.070, is prohibited and hereby declared to be a public nuisance that may be abated in accordance with this Chapter, and by any other means available by law.

(B) The prohibition in Subsection (A), above, includes renting, leasing, or otherwise permitting the cultivation of marijuana at any location.

7.124.070 Limited immunity for cultivation activities.

Notwithstanding the activities prohibited and declared a nuisance by Section 7.124.060, and notwithstanding that ~~a medical marijuana business~~the cultivation activity is not and shall not become a permitted use in the County for so long as this Chapter remains in effect, the cultivation of marijuana shall not be subject to the enforcement remedies set forth in the Santa Cruz County Code solely on the basis of: (1) an activity prohibited by Section 7.124.060; and (2) the fact that the cultivation of marijuana is not a permitted use in the County, provided however that, as authorized by California Health and Safety Code Section 11362.83, this limited immunity is available and may be asserted as an affirmative defense only so long as the cultivation activity does not violate any of the following restrictions and requirements:

(A) Cultivation within a ~~residence~~residential zone district. Cultivation of marijuana ~~inside a residence at any location~~within a residential zone district is prohibited except that cultivation by a qualified patient, person with an identification card, and/or primary caregiver within an enclosed, non-habitable structure, or if a non-habitable structure is not available or appropriate, within a residence. Cultivation shall be limited to no more than one hundred (100) square feet of total garden canopy per parcel. ~~allowed for a qualified patient, person with an identification card, and/or primary caregiver using the residence as his or her primary domicile. In no event shall the total garden canopy within a single residence exceed one hundred (100) square feet regardless of the number of qualified patients, persons with an identification card, and/or primary caregivers residing at that location. Outdoor cultivation is prohibited on any parcel where indoor cultivation takes place.~~

(B) Cultivation outside of a residential zone district. The cultivation of marijuana on a parcel located outside of a residential zone district, either within a non-habitable structure or outdoors, shall be limited to no more than one hundred (100) square feet of total garden canopy for each qualified patient, person with an identification card, and/or primary caregiver. In no event shall cultivation exceed three hundred (300) square feet per parcel, regardless of the number of persons collectively or cooperatively cultivating marijuana using that location. The cultivation of marijuana within an occupied dwelling or within three hundred (300) feet of an occupied dwelling is prohibited. If cultivation takes place outside, it shall be carried out in compliance

with all requirements of Title 16 of the Santa Cruz County Code (entitled "Environmental and Resource Protection".)

~~Indoor cultivation other than a residence. The indoor cultivation of marijuana within a building or structure other than a residence shall be limited to no more than one structure per parcel, and no more than one hundred (100) square feet of total garden canopy for each qualified patient, person with an identification card, and/or primary caregiver. In no event shall the indoor cultivation of marijuana within a building or structure other than a residence exceed three hundred (300) square feet regardless of the number of persons collectively or cooperatively cultivating marijuana at that location. The indoor cultivation of marijuana within a building or structure other than a residence is prohibited if the structure is located within a residential zone district or if the structure is located within three hundred (300) feet of an occupied dwelling unit. Outdoor cultivation is prohibited on any parcel where indoor cultivation~~ within a non-residential ~~building or structure subject to this subsection (B) takes place.~~

~~(C) Small Outdoor Cultivation. The outdoor cultivation of marijuana at a location that is less than one acre in size shall be carried out in compliance with all requirements of Title 16 of the Santa Cruz County Code (entitled "Environmental and Resource Protection"), and shall be limited to no more than one hundred (100) square feet of total garden canopy allowed for each qualified patient, person with an identification card, and/or primary caregiver acting together collectively or cooperatively. In no event shall the total garden canopy at that location exceed three hundred (300) square feet regardless of the number of persons collectively or cooperatively cultivating marijuana at that location. Indoor cultivation is prohibited on any parcel where outdoor cultivation takes place. Indoor cultivation may take place on a parcel subject to this subsection (C), however the combined area cultivated on the parcel may not exceed the limits imposed by this subsection.~~

(~~D~~C) ~~Large Outdoor~~ Cultivation on a large parcel outside of a residential zone district. The ~~outdoor~~ cultivation of marijuana at a location that is ~~one acre~~three (3) acres in size or greater shall be carried out in compliance with all requirements of Title 16 of the Santa Cruz County Code (entitled "Environmental and Resource Protection"), and shall be limited to no more than one hundred (100) square feet of total garden canopy allowed for each qualified patient, person with an identification card, and/or primary caregiver acting together collectively or cooperatively. In no event shall the total garden canopy at that location exceed one thousand (1,000) square feet regardless of the number of persons collectively or cooperatively cultivating marijuana, except that an ~~outdoor~~ cultivation site granted an exemption by the Planning Director pursuant to Santa Cruz County Code section 13.10.670 (g) as enacted by Ordinance #5090, shall not be subject to the maximum size limitations imposed herein so long as the area subject to cultivation is not expanded or enlarged beyond what existed at that location on of January 1, 2012. ~~Indoor cultivation is prohibited on any parcel where outdoor cultivation takes place. Indoor cultivation may take place on a parcel subject to this subsection (D), however the combined area cultivated on the parcel may not exceed the limits imposed by this subsection. On a parcel greater than one acre, the outdoor~~ The cultivation of marijuana within three hundred (300) feet of an occupied dwelling unit is prohibited. Such distance shall be measured in a straight line from the dwelling unit to the closest extent of the site where marijuana is cultivated.

(~~E~~D) Notwithstanding the provisions of this section 7.124.070, the ~~outdoor~~ cultivation of marijuana, in any amount or quantity upon any parcel located within six hundred (600) feet of any school, is hereby declared to be unlawful and a public nuisance that may be abated in

accordance with this Chapter. Such distance shall be measured in a straight line from the boundary line of the location upon which marijuana is cultivated to the boundary line of the location upon which the school is situated.

(~~F~~E) Notwithstanding the provisions of this Section 7.124.080, the outdoor cultivation of marijuana at any location is prohibited unless it takes place fully enclosed by an opaque fence at least six (6) feet in height. The fence must be adequately secure to prevent unauthorized entry.

(~~G~~F) No person owning, leasing, occupying, or having charge or possession of any parcel within the ~~county~~ County shall cause, allow, suffer, or permit such premises to be used for the outdoor or indoor cultivation of marijuana plants in violation of this Chapter.

(~~H~~G) For purposes of this Section 7.124.080, total garden canopy shall be measured by the combined vegetative growth area in active cultivation.

(H) Where more than one qualified patient, person with an identification card, and/or primary caregiver jointly cultivate medical marijuana at a single location as described in this subdivision 7.124.070, the names of the persons acting jointly shall remain posted at the location of the cultivation.

7.124.080 Medical marijuana identification card.

(A) The County of Santa Cruz shall establish a voluntary State identification card program operated by the Health Services Agency as authorized by Health and Safety Code Section 11362.7 et seq.. The purpose of this voluntary identification card program is to help law enforcement officers identify individuals whose possession of medical marijuana qualifies under Health and Safety Code Section 11362.5. The County recognizes that individuals who qualify to use medical marijuana may require the support of numerous caregivers to meet their needs for housing, health, or safety under California Health and Safety Code Section 11362.5(e). The County of Santa Cruz also recognizes that not all medical marijuana users will elect to access the medical marijuana user identification card and the existence of the program shall not limit the protections afforded by the Compassionate Use Act of 1996

(B) In addition to the fee charged by the State of California, the Health Services Agency is authorized to charge a fee sufficient to cover the County's costs of the medical marijuana user identification and primary caregiver identification cards program. The County fees charged are set by resolution of the Board of Supervisors. The Health Services Agency shall consider the extent of an applicant's ability to pay the whole or partial fee and may provide for fee waiver or reduction in appropriate cases.

(C) Possession. A qualified patient or a person holding a valid identification card, or the designated primary caregiver of that qualified patient or person, may possess amounts of marijuana up to three pounds of dried cannabis bud or conversion per year.

(D) If a qualified medical marijuana patient or primary caregiver has an attending physician's written, dated and signed recommendation that the quantities described in subsections (C) of this section are not sufficient to meet the medical marijuana patient's needs, said patient or caregiver may possess an amount of marijuana consistent with the attending physician's written recommendation.

7.124.~~080~~ 090 Limited severability.

(A) If any provision or clause of Sections 7.124.040 and/or 7.124.070 of this Chapter are held to be unconstitutional or otherwise invalid by any court of competent jurisdiction, such invalidity shall invalidate every other provision, clause and application of the invalidated Section, and to this end the provisions and clauses of Section 7.124.040 and 7.124.070 of this Chapter are declared to be inseverable.

(B) Except for the inseverability of the provisions, clauses and applications of Sections 7.124.040 and/or 7.124.070 on the terms set forth hereinabove, if any other provision or clause of this Chapter is held to be unconstitutional or otherwise invalid by any court of competent jurisdiction, such invalidity shall not affect those provisions, clauses or applications of this Chapter which can be implemented without the invalid provision, clause or application, and to this end the provisions and clauses of this Chapter other than Sections 7.124.040 and/or 7.124.070 are declared to be severable.

7.124.~~090~~ 100 Enforcement.

(A) Enforcement of this Chapter may be pursued by one or more of those alternatives set forth in subsection (A) of County Code section 19.01.030. It shall be a separate offense for each and every day during any portion of which any violation of, or failure to comply with, any provision of this Chapter is committed, continued or permitted.

(B) Whenever the Enforcing Officer determines that a public nuisance as defined in this Chapter exists at any location within the unincorporated area of Santa Cruz County, he or she is authorized to issue a Notice of Violation pursuant to County Code section 1.12.070, except that ~~the violator shall be provided with notice of the opportunity to remedy the violation within~~ the requirements for notice of the opportunity to correct or remedy the violation without civil penalties under subsection (a)(2) of Subdivision (D) of section 1.12.070 shall be seven (7) calendar days ~~without civil penalties~~.

(C) In the event a court of competent jurisdiction preliminarily or permanently enjoins, or holds to be unconstitutional or otherwise invalid, any enforcement remedy provided for in this Section, then the remainder of the enforcement remedies provided for by this Section shall remain in full force and effect.

7.124.~~100~~ 110 No Duty to Enforce.

Nothing in this Chapter shall be construed as imposing on the Enforcing Officer or the County of Santa Cruz any duty to issue a notice of violation, nor to abate any unlawful marijuana business activity or cultivation, nor to take any other action with regard to any unlawful marijuana business activity or cultivation, and neither the Enforcing Officer nor the County shall be held liable for failure to issue an order to abate any unlawful marijuana business activity or cultivation, nor for failure to abate any unlawful marijuana business activity or cultivation, nor for failure to take any other action with regard to any unlawful marijuana business activity or cultivation.

SECTION III

The Santa Cruz County Code is hereby amended by deleting existing 13.10.670 in its entirety.

SECTION IV

The "Commercial Uses Chart" in Subdivision (B) of Section 13.10.332 of the Santa Cruz County Code is hereby amended by deleting the reference to "medical marijuana cooperatives" in its entirety.

SECTION V

The Santa Cruz County Code is hereby amended by deleting the definition of "Medical marijuana cooperative" in Section 13.10.700-M.

SECTION VI

This ordinance shall take effect on the 31st day after the date of final passage.

PASSED AND ADOPTED this ____ day of _____, 2013, by the Board of Supervisors of the County of Santa Cruz by the following vote:

AYES: SUPERVISORS
NOES: SUPERVISORS
ABSENT: SUPERVISORS
ABSTAIN: SUPERVISORS

_____
Chairperson of the
Board of Supervisors

Attest:_____
Clerk of the Board

APPROVED AS TO FORM:

_____
County Counsel

cc: County Administrative Office
Planning Director

ORDINANCE NO. _____

ORDINANCE DELETING EXISTING CHAPTER 7.124 OF THE SANTA CRUZ COUNTY CODE REGARDING MEDICAL MARIJUANA; DELETING EXISTING 13.10.670; AMENDING THE COMMERCIAL USES CHART IN SUBDIVISION (B) OF SECTION 13.10.332 BY DELETING THE REFERENCE TO "MEDICAL MARIJUANA COOPERATIVES"; DELETING THE REFERENCE TO "MEDICAL MARIJUANA COOPERATIVES" IN 13.10.700-M.; AND ADDING NEW CHAPTER 7.124 ALL RELATING TO MEDICAL MARIJUANA

The Board of Supervisors of Santa Cruz County hereby finds and declares the following:

WHEREAS, in 1992 the voters of the County of Santa Cruz enacted Measure "A", adding Chapter 7.122 to the Santa Cruz County Code which declared support for making marijuana available for medical use; and

WHEREAS, in 1996, the voters of the State of California approved Proposition 215 (codified as California Health and Safety Code section 11362.5, and entitled "The Compassionate Use Act of 1996").

WHEREAS, the intent of Proposition 215 was to enable persons who are in need of marijuana for medical purposes to use it without fear of criminal prosecution under limited, specified circumstances. The proposition further provides that "nothing in this section shall be construed to supersede legislation prohibiting persons from engaging in conduct that endangers others, or to condone the diversion of marijuana for non-medical purposes." The ballot arguments supporting Proposition 215 expressly acknowledged that "Proposition 215 does not allow unlimited quantities of marijuana to be grown anywhere"; and

WHEREAS, the Board of Supervisors added Chapter 7.124 to the Santa Cruz County Code which implemented provisions of Proposition 215 by establishing a medical marijuana identification card program operated by the County; and

WHEREAS, in 2004, the Legislature enacted Senate Bill 420 (codified as California Health and Safety Code sections 11362.7 et seq.) to clarify the scope of Proposition 215, and to provide qualifying patients and primary caregivers who collectively or cooperatively cultivate marijuana for medical purposes with a limited defense to certain specified State criminal statutes; and

WHEREAS, Health and Safety Code section 11362.83 expressly allows cities and counties to adopt and enforce ordinances that are consistent with Senate Bill 420; and

WHEREAS, following enactment of Senate Bill 420, Chapter 7.124 was amended to establish local guidelines consistent with the new State law for the possession and cultivation of medical marijuana used by qualified patients and care givers; and

WHEREAS, the federal Controlled Substances Act, 21 U.S.C. §§ 801 et seq., classifies marijuana as a Schedule I Drug, which is defined as a drug or other substance that has a high

potential for abuse, that has no currently accepted medical use in treatment in the United States, and that has not been accepted as safe for use under medical supervision. The Federal Controlled Substances Act makes it unlawful, under federal law, for any person to cultivate, manufacture, distribute or dispense, or possess with intent to manufacture, distribute or dispense, marijuana. The Federal Controlled Substances Act contains no exemption for the cultivation, manufacture, distribution, dispensation, or possession of marijuana for medical purposes; and

WHEREAS, the County's unique geographic and climatic conditions, which includes dense forested areas receiving substantial precipitation, provide conditions that are favorable to marijuana cultivation; and

WHEREAS, Proposition 215 and Senate Bill 420 primarily address the criminal law, providing qualifying patients and primary caregivers with limited immunity from state criminal prosecution under certain identified statutes. Neither Proposition 215, Senate Bill 420, the relevant provisions of the Santa Cruz County Code, nor the Attorney General's August 2008 Guidelines for the Security and Non-Diversion of Marijuana Grown for Medical Use adopted pursuant to Senate Bill 420, provide comprehensive civil regulation of premises used for marijuana cultivation. The unregulated cultivation of marijuana in the unincorporated area of Santa Cruz County can adversely affect the health, safety, and well-being of the county and its residents. Comprehensive civil regulation of premises used for marijuana cultivation is proper and necessary to avoid the risks of criminal activity, degradation of the natural environment, obnoxious smells, and indoor electrical fire hazards that may result from unregulated marijuana cultivation, and are especially significant if the amount of marijuana cultivated at a location is not regulated and substantial amounts of marijuana are thereby allowed to be concentrated in one place; and

WHEREAS, on May 6, 2013, the California Supreme Court unanimously ruled in *City of Riverside v. Inland Empire Patients Health and Wellness Center, Inc.* ("*Inland Empire*"), that California's medical marijuana laws do not preempt local ordinances that ban medical marijuana facilities. The Court found that the local police power derived from Article XI, section 7, of the California Constitution includes broad authority to determine, for purposes of public health, safety, and welfare, the appropriate uses of land within a local jurisdiction's borders, and that "[n]othing in the CUA or the MMP expressly or impliedly limits the inherent authority of a local jurisdiction, by its own ordinances, to regulate the use of its land, including the authority to provide that facilities for the distribution of medical marijuana will not be permitted to operate within its borders"; and

WHEREAS, cultivation of any amount of marijuana at locations or premises within six hundred feet of a school creates unique risks that the marijuana plants may be observed by juveniles, and therefore be especially vulnerable to theft or recreational consumption by juveniles. Further, the potential for criminal activities associated with marijuana cultivation in such locations poses heightened risks that juveniles will be involved or endangered. Therefore, cultivation of any amount of marijuana in such locations or premises is especially hazardous to public safety and welfare, and to the protection of children and the person(s) cultivating the marijuana plants; and

WHEREAS, as recognized by the Attorney General's August 2008 Guidelines for the Security and Non-Diversion of marijuana grown for medical use, the cultivation or other

concentration of marijuana in any location or premises without adequate security increases the risk that surrounding homes or businesses may be negatively impacted by nuisance activity such as loitering or crime; and

WHEREAS, it is the purpose and intent of this chapter to implement state law by providing a means for regulating the cultivation of medical marijuana in a manner that is consistent with state law and which balances the needs of medical patients and their caregivers and promotes the health, safety, and welfare of the residents and businesses within the unincorporated territory of Santa Cruz County. This chapter is intended to be consistent with Proposition 215 and Senate Bill 420, and towards that end, is not intended to prohibit persons from individually, collectively, or cooperatively exercising any right otherwise granted by state law. Rather, the intent and purpose of this chapter is to establish reasonable regulations upon the manner in which marijuana may be cultivated, including restrictions on the amount of marijuana that may be individually, collectively, or cooperatively cultivated in any location or premises, in order to protect the public health, safety, and welfare in Santa Cruz County; and

WHEREAS, the limited right of qualified patients and their primary caregivers under state law to cultivate marijuana plants for medical purposes does not confer the right to create or maintain a public nuisance. By adopting the regulations contained in this chapter, Santa Cruz County will achieve a significant reduction in the aforementioned harms caused or threatened by the unregulated cultivation of marijuana in the unincorporated area of the County; and

WHEREAS, nothing in this ordinance shall be construed to allow the use of marijuana for non-medical purposes, or allow any activity relating to the cultivation, distribution, or consumption of marijuana that is otherwise illegal under state or federal law. No provision of this chapter shall be deemed a defense or immunity to any action brought against any person by the Santa Cruz County District Attorney, the Attorney General of the State of California, or the United States of America.

NOW THEREFORE the Board of Supervisors of the County of Santa Cruz ordains as follows:

SECTION I

The Santa Cruz County Code is hereby amended by deleting Chapter 7.124 in its entirety.

SECTION II

The Santa Cruz County Code is hereby amended by adding new Chapter 7.124 to read as follows:

Chapter 7.124
Medical Marijuana

Sections:

7.124.010 Purpose.

The purpose of this Chapter is to prohibit medical marijuana businesses and cultivation while granting limited immunity from the enforcement of its prohibition to those medical marijuana businesses and cultivation activities that do not violate the restrictions and limitations set forth in this Chapter.

It is also the purpose of this Chapter to mitigate the negative impacts and secondary effects associated with ongoing medical marijuana businesses and cultivation activity, including but not limited to demands placed on law enforcement and administrative resources; neighborhood disruption; the exposure of children to medical marijuana; drug sales to minors and adults; fraud in issuing, obtaining or using medical marijuana recommendations; robberies, burglaries, assaults, drug trafficking and other violent crimes; and the damage to the natural environment resulting from destructive cultivation activity.

This Chapter is not intended to conflict with federal or State law. It is the intention of the County that this Chapter be interpreted to be compatible with federal and state enactments and in furtherance of the public purposes that those enactments encompass.

7.124.020 Definitions.

As used in this Chapter, the following words and phrases shall have the meanings respectively ascribed to them by this section:

(A) "Building" means any structure having a roof supported by columns or walls, for the housing, shelter or enclosure of persons, animals, chattels, or property of any kind.

(B) "Cultivation" or "Cultivate" means the planting, growing, harvesting, drying, processing or storage of one or more marijuana plants or any part thereof in any location, indoor or outdoor, including within a fully enclosed and secure building.

(C) "Enforcing Officer" means the Planning Director or any other peace officer, public official or employee duly authorized to enforce against violations of the County Code.

(D) "Fence" means a wall or barrier connected by boards, masonry, rails, panels or any other materials for the purpose of enclosing space or separating parcels of land. For purposes of this Chapter, the term "Fence" does not include tarpaulins, scrap material, bushes or hedgerows.

(E) "Hazardous Materials" means any substance that is "flammable, reactive, corrosive or toxic", as further defined in California Health and Safety Code Sections 25501 and 25503.5, as may be amended.

(F) "Location" or "Parcel" means that unit of land assigned a unique Assessor's Parcel Number by the County Assessor, whether vacant or occupied by a building, group of buildings, or accessory buildings, and includes the buildings, structures, yards, open spaces, lot width, and lot area.

(G) "Manager" means any person to whom a medical marijuana business has delegated discretionary powers to organize, direct, carry on or control its operations. Authority to control one or more of the following functions shall be prima facie evidence that such a person is a manager of the business: (1) to hire, select, direct, schedule or assign employees or staff, including volunteers; (2) to acquire facilities, furniture, equipment or supplies other than the occasional replenishment of stock; (3) to disburse funds of the business other than for the receipt of regularly replaced items of stock; or (4) to make, or participate in making, policy decisions relative to operations of the business.

(H) "Marijuana" shall be construed as defined in California Health and Safety Code Section 11018 and further shall specifically include any product that contains marijuana or a derivative of marijuana.

(I) "Marijuana plant" means any mature or immature marijuana plant, or any marijuana seedling, unless otherwise specifically provided herein.

(J) "Medical marijuana business" means either of the following:

(1) Any location where marijuana is distributed, delivered, dispensed, sold or given away to a qualified patient, a person with an identification card, or a primary caregiver.

(2) Any vehicle or other mode of transportation, stationary or mobile, which is used to transport, distribute, deliver, dispense, or give away marijuana to a qualified patient, a person with an identification card, or a primary caregiver.

(3) Notwithstanding Subparagraphs (1) and (2) above, "medical marijuana business" shall not include any of the following:

(a) A residence or dwelling unit where the requirements of Subdivision (A) of Section 7.124.070 are met;

(b) Any location during only that time reasonably required for a primary caregiver to distribute, deliver, dispense or give away marijuana to a qualified patient or person with an identification card who has designated the individual as a primary caregiver, for the personal medical use of the qualified patient or person with an identification card, in accordance with California Health and Safety Code Section 11362.5 and 11362.7 *et seq.;*

(c) The location of any clinic licensed pursuant to Chapter 1 (commencing with Section 1200), a health care facility licensed pursuant to Chapter 2 (commencing with Section 1250), a residential care facility for persons with chronic life-threatening illness licensed pursuant to Chapter 3.01 (commencing with Section 1568.01), a residential care facility for the elderly licensed pursuant to Chapter 3.2 (commencing with Section 1569), a hospice, or a home health agency licensed pursuant to Chapter 8 (commencing with Section 1725), all of Division 2 of the California Health and Safety Code where: (i) a qualified patient or person with an identification card receives medical care or supportive services, or both, from the clinic, facility, hospice, or home health agency, and (ii) the owner or operator, or one of not more than three employees designated by the owner or operator, of the clinic, facility, hospice, or home health agency has been designated as a

primary caregiver pursuant to California Health and Safety Code Section 11362.7(d) by that qualified patient or person with an identification card; or

(d) Any vehicle during only that time reasonably required for its use by: (i) a qualified patient or person with an identification card to transport marijuana for his or her personal medical use, or (ii) a primary caregiver to transport, distribute, deliver, dispense, or give marijuana to a qualified patient or person with an identification card who has designated the individual as a primary caregiver, for the personal medical use of the qualified patient or person with an identification card, in accordance with California Health and Safety Code Section 11362.765.

(K) "Outdoor" or "Outdoors" means any location that is not "indoors" within a fully enclosed and secure structure as defined herein.

(L) "Residence" means a fully enclosed structure, including any attached garage or ancillary structure, used as the primary dwelling unit of a "Person with an identification card"; "Primary caregiver"; or "Qualified patient".

(M) "Residential zone district" means a zone district designated as RR, R-1, RB or RM by the Santa Cruz County Zoning Ordinance.

(N) "School" means any licensed preschool or any public or private school providing instruction in kindergarten or grades 1 to 12, inclusive, but does not include any private school in which education is primarily conducted in private homes.

(O) "Structure" means anything constructed or erected which is supported directly or indirectly on the earth, but not including any vehicle.

(P) "Vehicle" means a device by which any person or property may be propelled, moved, or drawn upon a street, sidewalk or waterway, including but not limited to a device moved exclusively by human power.

(Q) The following words or phrases when used in this Section shall be construed as defined in California Health and Safety Code Sections 1746,11362.5, 11362.7, and 11834.02. "Alcoholism or drug abuse recovery or treatment facility"; "Hospice"; "Identification card"; "Person with an identification card"; "Primary caregiver"; and "Qualified patient".

7.124.030 Prohibited business activities.

(A) It is unlawful and shall constitute a public nuisance to own, establish, operate, use, or permit the establishment or operation of a medical marijuana business, or to participate as an employee, contractor, agent or volunteer, or in any other manner or capacity in any medical marijuana business.

(B) The prohibition in Subsection (A), above, includes renting, leasing, or otherwise permitting a medical marijuana business to occupy or use a location, vehicle, or other mode of transportation.

7.124.040 Limited immunity for medical marijuana business.

Notwithstanding the activities prohibited by Section 7.124.030, and notwithstanding that medical marijuana business is not and shall not become a permitted use in the County for so long as this Chapter remains in effect, a medical marijuana business shall not be subject to the enforcement remedies set forth in the Santa Cruz County Code solely on the basis of: (1) an activity prohibited by Section 7.124.030; and (2) the fact that medical marijuana business is not a permitted use in the County, provided however that, as authorized by California Health and Safety Code Section 11362.83, this limited immunity is available and may be asserted as an affirmative defense only so long as: (a) subsections (A) through (P) of this Section 7.124.040 remain in effect in their entirety; (b) it is asserted by a medical marijuana business at the one location identified in its original or any amended seller permit issued by the State Board of Equalization; and (c) the medical marijuana business does not violate any of the following:

(A) Every medical marijuana business is prohibited that was not operating within the County of Santa Cruz as a medical marijuana business with a valid Seller's Permit issued by the State Board of Equalization before January 1, 2012, and maintains said permit without interruption;

(B) Every medical marijuana business is prohibited that remains open and/or operating between the hours of 10:00 p.m. and 8:00 a.m.;

(C) Every medical marijuana business is prohibited where marijuana and/or alcohol are consumed at the premises including any area used for parking any vehicle;

(D) Every medical marijuana business is prohibited that allows a minor unaccompanied by a parent or legal guardian to enter its premises;

(E) Every medical marijuana business is prohibited where marijuana is visible from the exterior of the premises;

(F) Every medical marijuana business is prohibited that illuminates any portion of its premises between the hours of 8:00 p.m. and 10:00 a.m. by lighting that is visible from the exterior of the premises, except such lighting as is reasonably utilized for the security of the premises;

(G) Every medical marijuana business is prohibited unless it is located in a zone district designated as PA (Professional and Administrative Offices), C-1 (Neighborhood Commercial), C-2 (Community Commercial), C-4 (Commercial Services), or C-T (Tourist Commercial) by the Santa Cruz County Zoning Ordinance. This subsection shall not apply to defeat the limited immunity claim of a medical marijuana business that is otherwise entitled to assert said claim of immunity if it moves within one hundred eighty (180) days after the effective date of this Chapter to a location that does not violate this subsection;

(H) Every medical marijuana business is prohibited where one or more members of its ownership interest have failed an annual LiveScan background check. The LiveScan background check shall be completed by January 31st of each year. The results of each LiveScan check conducted shall be maintained in the offices of the business for a period of at least three (3) years, and made available for review upon the request of any enforcing officer.

(1) "Ownership interest" for the purposes of this subsection shall mean any person with an ownership interest in the business of more than ten (10%) percent, or if incorporated, a directing role, including, but not limited to:

(a) A sole proprietor;

(b) A general or limited partner;

(c) A member of the board of directors;

(d) A corporate officer.

(2) A failed LiveScan is a LiveScan that includes any drug-related felony conviction within the past ten years and/or current parole or probation for the sale or distribution of a controlled substance, but not including a felony conviction for a marijuana-related offense unless that particular offense involved sales to a minor.

(I) Every medical marijuana business is prohibited that has one or more Managers who are also Managers at the same time of another medical marijuana business in the County;

(J) Every medical marijuana business is prohibited that provides an on-site location for physicians or medical professionals to write recommendations;

(K) Every medical marijuana business is prohibited that does not provide litter and graffiti removal services for the business premises on a daily basis;

(L) Every medical marijuana business is prohibited that does not provide dedicated security personnel during its hours of operation;

(M) Every medical marijuana business is prohibited that prints, publishes, advertises or disseminates in any way or by any means of communication, or causes to be printed, published, advertised or disseminated in any way or by any means of communication, including, but not limited to the use of the internet, any notice or advertisement that mentions or refers to the distribution, delivery, dispensing, sale, or giving away of marijuana.

Notwithstanding the limitations imposed by this subdivision (M), a medical marijuana business may provide the following: (a) an entry in the telephone directory with the name, location and phone number of the business; (b) signage as permitted by Section 7.124.040; or (c) a website with the name, location and phone number of the business. Such directory entry or web site may identify the business as a "medical marijuana dispensary", but shall not include the display of sales prices for any product, except on a password required portal that may only be accessed by cooperative or collective members of the business.

(N) Every medical marijuana business is prohibited that provides signage for the business other than one identifying sign stating the business name, address and hours of operation; such signs shall not exceed four square feet in area, shall not be directly illuminated, and shall not contain graphics identifying marijuana.

(O) Every medical marijuana business is prohibited that is located within: (1) six hundred (600) feet from a school; or (2) six hundred (600) feet from another medical marijuana business. The distance specified in this paragraph shall be the horizontal distance measured in a straight line from the property line of the school or other medical marijuana business, to the closest property line of the lot on which the medical marijuana business is located without regard to intervening structures. In the event that two or more medical marijuana businesses are located within six hundred (600) feet of one another, only the medical marijuana business with the earliest issuance date on a State Board of Equalization seller's permit for its operation at the location may assert the limited immunity provided by this Chapter. The distance requirements set forth in this subsection shall not apply to: (i) those licensed health care and other facilities identified in California Health and Safety Code Section 11362.7(d)(1); (ii) defeat the limited immunity claim of a medical marijuana business that is otherwise entitled to assert the limited immunity provided by this Chapter if it moves within 180 days after the effective date of this Chapter to a location that does not violate the distance requirements; and (iii) a medical marijuana business that is in violation of the distance requirement of this subsection as a result of the establishment of a conflicting use (a school~~, public park~~ or other medical marijuana business) after the date on which the State Board of Equalization issued a seller permit to the medical marijuana business for its location.

(P) Every medical marijuana business is prohibited that fails to obtain the information required by subsections (1) or (2) of this subdivision (P). The information collected shall be maintained in the offices of the business for a period of at least one (1) year, and made available for review upon the request of any enforcing officer:

(1) If the marijuana was grown at a site described by subdivision (A) of section 7.124.070, documentation from the marijuana cultivator that the residence or structure where cultivation takes place is in compliance with the building code requirements applicable to the cultivation methods employed. The medical marijuana business shall employ a licensed contractor to conduct at least one site inspection each year to verify the documentation provided by the cultivator.

(2) If the marijuana was grown at a site described by subdivisions (B) or (C) of section 7.124.070, the following information:

(a) The name of the person cultivating the marijuana.

(b) The address of the location at which the marijuana is cultivated.

(c) If the cultivator does not own the property where the marijuana cultivation takes place, the name and phone number of the property owner. The medical marijuana business shall contact the property owner and confirm that the property owner does not object to use of the property for cultivation.

(d) If any indoor cultivation takes place on the property, documentation from the marijuana cultivator that the structure where cultivation takes place is in compliance with the building code requirements to the cultivation methods employed. The medical marijuana business shall employ a licensed contractor to conduct at least one site inspection each year to verify the documentation provided by the cultivator.

The limited immunity provided by this Section shall not be available to and shall not be asserted as an affirmative defense to any violation of law except as expressly set forth in this Chapter. Further, nothing contained in this limited immunity is intended to provide or shall be asserted as a defense to a claim for violation of law brought by any county, state, or federal governmental authority. Finally, the limited immunity provided by this Section shall be available and may be asserted only so long as each and every provision and clause of subsections (A) through (P) and of this Section 7.124.040 remain valid, effective and operative.

7.124.050 No vested or nonconforming rights.

(A) This Chapter prohibits medical marijuana businesses. Neither this Chapter, nor any other provision of this Code or action, failure to act, statement, representation, certificate, approval, or permit issued by the County or its departments, or their respective representatives, agents, employees, attorneys or assigns, shall create, confer, or convey any vested or nonconforming right or benefit regarding any medical marijuana business. Any immunity or benefit conferred by this Chapter shall expire permanently and in full upon repeal of this Chapter.

(B) All existing medical marijuana businesses must immediately cease operation; except that any medical marijuana business that that does not violate any of the medical marijuana business prohibitions described in Section 7.124.040, Limited Immunity, may continue to operate but only so long as subsections (A) through (P) of Section 7.124.040 remain valid, effective and operative.

7.124.060 Prohibited cultivation activities.

(A) The cultivation of marijuana, either indoors or outdoors, at any location in an amount or quantity greater than as provided herein, or in any other way not in conformance with or in violation of any provision of ~~this~~ Section 7.124.070, is prohibited and hereby declared to be a public nuisance that may be abated in accordance with this Chapter, and by any other means available by law.

(B) The prohibition in Subsection (A), above, includes renting, leasing, or otherwise permitting the cultivation of marijuana at any location.

7.124.070 Limited immunity for cultivation activities.

Notwithstanding the activities prohibited and declared a nuisance by Section 7.124.060, and notwithstanding that the cultivation activity is not and shall not become a permitted use in the County for so long as this Chapter remains in effect, the cultivation of marijuana shall not be subject to the enforcement remedies set forth in the Santa Cruz County Code solely on the basis of: (1) an activity prohibited by Section 7.124.060; and (2) the fact that the cultivation of marijuana is not a permitted use in the County, provided however that, as authorized by California Health and Safety Code Section 11362.83, this limited immunity is available and may be asserted as an affirmative defense only so long as the cultivation activity does not violate any of the following restrictions and requirements:

(A) Cultivation within a residential zone district. Cultivation of marijuana within a residential zone district is prohibited except that cultivation by a qualified patient, person with an identification card, and/or primary caregiver within an enclosed, non-habitable structure, or if a

non-habitable structure is not available or appropriate, within a residence. Cultivation shall be limited to no more than one hundred (100) square feet of total garden canopy per parcel.

(B) Cultivation outside of a residential zone district. The cultivation of marijuana on a parcel located outside of a residential zone district, either within a non-habitable structure or outdoors, shall be limited to no more than one hundred (100) square feet of total garden canopy for each qualified patient, person with an identification card, and/or primary caregiver. In no event shall cultivation exceed three hundred (300) square feet per parcel, regardless of the number of persons collectively or cooperatively cultivating marijuana using that location. The cultivation of marijuana within an occupied dwelling or within three hundred (300) feet of an occupied dwelling is prohibited. If cultivation takes place outside, it shall be carried out in compliance with all requirements of Title 16 of the Santa Cruz County Code (entitled "Environmental and Resource Protection".)

(C) Cultivation on a large parcel outside of a residential zone district. The cultivation of marijuana at a location that is three (3) acres in size or greater shall be carried out in compliance with all requirements of Title 16 of the Santa Cruz County Code (entitled "Environmental and Resource Protection"), and shall be limited to no more than one hundred (100) square feet of total garden canopy allowed for each qualified patient, person with an identification card, and/or primary caregiver acting together collectively or cooperatively. In no event shall the total garden canopy at that location exceed one thousand (1,000) square feet regardless of the number of persons collectively or cooperatively cultivating marijuana, except that an cultivation site granted an exemption by the Planning Director pursuant to Santa Cruz County Code section 13.10.670 (g) as enacted by Ordinance #5090, shall not be subject to the maximum size limitations imposed herein so long as the area subject to cultivation is not expanded or enlarged beyond what existed at that location on of January 1, 2012. The cultivation of marijuana within three hundred (300) feet of an occupied dwelling unit is prohibited. Such distance shall be measured in a straight line from the dwelling unit to the closest extent of the site where marijuana is cultivated.

(D) Notwithstanding the provisions of this section 7.124.070, the cultivation of marijuana, in any amount or quantity upon any parcel located within six hundred (600) feet of any school, is hereby declared to be unlawful and a public nuisance that may be abated in accordance with this Chapter. Such distance shall be measured in a straight line from the boundary line of the location upon which marijuana is cultivated to the boundary line of the location upon which the school is situated.

(E) Notwithstanding the provisions of this Section 7.124.080, the outdoor cultivation of marijuana at any location is prohibited unless it takes place fully enclosed by an opaque fence at least six (6) feet in height. The fence must be adequately secure to prevent unauthorized entry.

(F) No person owning, leasing, occupying, or having charge or possession of any parcel within the County shall cause, allow, suffer, or permit such premises to be used for the outdoor or indoor cultivation of marijuana plants in violation of this Chapter.

(G) For purposes of this Section 7.124.080, total garden canopy shall be measured by the combined vegetative growth area in active cultivation.

(H) Where more than one qualified patient, person with an identification card, and/or primary caregiver jointly cultivate medical marijuana at a single location as described in this subdivision 7.124.070, the names of the persons acting jointly shall remain posted at the location of the cultivation.

7.124.080 Medical marijuana identification card.

(A) The County of Santa Cruz shall establish a voluntary State identification card program operated by the Health Services Agency as authorized by Health and Safety Code Section 11362.7 et seq.. The purpose of this voluntary identification card program is to help law enforcement officers identify individuals whose possession of medical marijuana qualifies under Health and Safety Code Section 11362.5. The County recognizes that individuals who qualify to use medical marijuana may require the support of numerous caregivers to meet their needs for housing, health, or safety under California Health and Safety Code Section 11362.5(e). The County of Santa Cruz also recognizes that not all medical marijuana users will elect to access the medical marijuana user identification card and the existence of the program shall not limit the protections afforded by the Compassionate Use Act of 1996

(B) In addition to the fee charged by the State of California, the Health Services Agency is authorized to charge a fee sufficient to cover the County's costs of the medical marijuana user identification and primary caregiver identification cards program. The County fees charged are set by resolution of the Board of Supervisors. The Health Services Agency shall consider the extent of an applicant's ability to pay the whole or partial fee and may provide for fee waiver or reduction in appropriate cases.

(C) Possession. A qualified patient or a person holding a valid identification card, or the designated primary caregiver of that qualified patient or person, may possess amounts of marijuana up to three pounds of dried cannabis bud or conversion per year.

(D) If a qualified medical marijuana patient or primary caregiver has an attending physician's written, dated and signed recommendation that the quantities described in subsections (C) of this section are not sufficient to meet the medical marijuana patient's needs, said patient or caregiver may possess an amount of marijuana consistent with the attending physician's written recommendation.

7.124.090 Limited severability.

(A) If any provision or clause of Sections 7.124.040 and/or 7.124.070 of this Chapter are held to be unconstitutional or otherwise invalid by any court of competent jurisdiction, such invalidity shall invalidate every other provision, clause and application of the invalidated Section, and to this end the provisions and clauses of Section 7.124.040 and 7.124.070 of this Chapter are declared to be inseverable.

(B) Except for the inseverability of the provisions, clauses and applications of Sections 7.124.040 and/or 7.124.070 on the terms set forth hereinabove, if any other provision or clause of this Chapter is held to be unconstitutional or otherwise invalid by any court of competent jurisdiction, such invalidity shall not affect those provisions, clauses or applications of this Chapter which can be implemented without the invalid provision, clause or application, and to this end the provisions and clauses of this Chapter other than Sections 7.124.040 and/or 7.124.070 are declared to be severable.

7.124.100 Enforcement.

(A) Enforcement of this Chapter may be pursued by one or more of those alternatives set forth in subsection (A) of County Code section 19.01.030. It shall be a separate offense for each and every day during any portion of which any violation of, or failure to comply with, any provision of this Chapter is committed, continued or permitted.

(B) Whenever the Enforcing Officer determines that a public nuisance as defined in this Chapter exists at any location within the unincorporated area of Santa Cruz County, he or she is authorized to issue a Notice of Violation pursuant to County Code section 1.12.070, except that the requirements for notice of the opportunity to correct or remedy the violation without civil penalties under subsection (a)(2) of Subdivision (D) of section 1.12.070 shall be seven (7) calendar days.

(C) In the event a court of competent jurisdiction preliminarily or permanently enjoins, or holds to be unconstitutional or otherwise invalid, any enforcement remedy provided for in this Section, then the remainder of the enforcement remedies provided for by this Section shall remain in full force and effect.

7.124.110 No Duty to Enforce.

Nothing in this Chapter shall be construed as imposing on the Enforcing Officer or the County of Santa Cruz any duty to issue a notice of violation, nor to abate any unlawful marijuana business activity or cultivation, nor to take any other action with regard to any unlawful marijuana business activity or cultivation, and neither the Enforcing Officer nor the County shall be held liable for failure to issue an order to abate any unlawful marijuana business activity or cultivation, nor for failure to abate any unlawful marijuana business activity or cultivation, nor for failure to take any other action with regard to any unlawful marijuana business activity or cultivation.

SECTION III

The Santa Cruz County Code is hereby amended by deleting existing 13.10.670 in its entirety.

SECTION IV

The "Commercial Uses Chart" in Subdivision (B) of Section 13.10.332 of the Santa Cruz County Code is hereby amended by deleting the reference to "medical marijuana cooperatives" in its entirety.

SECTION V

The Santa Cruz County Code is hereby amended by deleting the definition of "Medical marijuana cooperative" in Section 13.10.700-M.

SECTION VI

This ordinance shall take effect on the 31st day after the date of final passage.

PASSED AND ADOPTED this ____ day of _____, 2013, by the Board of Supervisors of the County of Santa Cruz by the following vote:

AYES: SUPERVISORS
NOES: SUPERVISORS
ABSENT: SUPERVISORS
ABSTAIN: SUPERVISORS

_____
Chairperson of the
Board of Supervisors

Attest:_____
Clerk of the Board

APPROVED AS TO FORM:

_____
County Counsel

cc: County Administrative Office
Planning Director

CALIFORNIA ENVIRONMENTAL QUALITY ACT
NOTICE OF EXEMPTION

The Santa Cruz County Planning Department has reviewed the project described below and has determined that it is exempt from the provisions of CEQA as specified in Sections 15061 - 15332 of CEQA for the reason(s) which have been specified in this document.

Application Number: N/A
Assessor Parcel Number: County-wide
Project Location: County-wide

Project Description: Proposed Ordinance deleting Chapter 7.124, deleting Section 13.10.670, amending the Commercial Uses Chart and the definitions of the Zoning Ordinance, and enacting new Chapter 7.124, all relating to medical marijuana

Person or Agency Proposing Project: County of Santa Cruz

Staff Contact and Phone Number: Rahn Garcia – 454-2040

A. ____ The proposed activity is not a project under CEQA Guidelines Section 15378.

B. __X__ The proposed activity is not subject to CEQA as specified under CEQA Guidelines Section 15060 (c).

C. ____ **Ministerial Project** involving only the use of fixed standards or objective measurements without personal judgment.

D. ____ **Statutory Exemption** other than a Ministerial Project (CEQA Guidelines Section 15260 to 15285).

E. __X__ **Categorical Exemption**

CEQA Guidelines Section 15308: Action by Regulatory Agencies for the Protection of the Environment

F. Reasons why the project is exempt:

Enactment of this ordinance will not authorize or permit the operation of medical marijuana dispensaries or the cultivation of marijuana. As such, adoption of the ordinance will not result in a direct or reasonably foreseeable indirect physical change in the environment (CEQA Guidelines Section 15060(c)(2)). The ordinance establishes a framework which the County will apply to exercise its enforcement discretion involving medical marijuana dispensaries or marijuana cultivation operations. The potential for enforcement arising from the ordinance is an action by a regulatory agency for purposes of protecting the environment.

In addition, none of the conditions described in Section 15300.2 apply to this project.

Staff Planner: _____ Date: September 16, 2013
Ken Hart

-----Original Message-----
From: Eric Hoffman [mailto:eric@bonnydoonalpacas.org]
Sent: Friday, September 27, 2013 3:32 PM
To: Neal Coonerty
Subject: pending marijuana regulations

Dear Supervisor Coonerty,

My name is Eric Hoffman. I've been a resident of Bonny Doon since l973. In my time in Bonny Doon I've served on the school board (7 years) and been active in environmental issues as a writer of books and articles for many publications. In fact, two of my books "Adventuring in Belize" and "Adventuring in Australia" (Sierra Club Books/Random House) were sold for many years in your bookstore.

I've been following the news reports about the pending regulations concerning the cultivation and use of marijuana. I realize this is a a difficult issue and you and your colleagues on the board have spent many hours formulating the best possible course for Santa Cruz County.
I'd like to address an area I have not seen mentioned in the news reports.

Odor: When in bloom marijuana smells like a mild to moderate skunk odor . We know this because we have a neighbor who grows marijuana near his neigbors fences. Depending on the way the wind is blowing the odor can drift far and wide and at times it is not pleasant.
The number of plants our neighbor grows varies, but I'd estimate somewhere in the range of 60 to 100 plants. (I don't know his legal status or how many plants are currently legal under permitting rules.) These plants are farmed in an area that measures about 10 by 20', or about 200 square feet. In a recent Santa Cruz Sentinnel article I noticed outside "grows" were slated to be as large as 1000 square feet and inside grows were limited to 100 square feet. An outside patch this size would produce a great deal of odor. In our case the patch described solicits many comments from visitors to our property (from the UPS man to school children visiting our farm). In your discussion of "offsets" have deliberations addressed the smell neighbors will live with and reasonable offsets from neighboring properties and homes? In your pending regulations I hope distance from property lines and neighboring properties has been carefully considered based on actual field studies. As far as we are concerned, we'd rather see the larger "grows" near neighbors who have no involvment in this product farmed inside a structure.

Best regards,

Eric Hoffman

October 18, 2013

VIA ELECTRONIC AND EXPRESS MAIL
terry.dorsey@co.santa-cruz.ca.us

Board of Supervisors
County of Santa Cruz
c/o Chairperson Neal Coonerty
701 Ocean Street, Room 500
Santa Cruz, California 95060

Re: Proposed Ordinance Deleting Chapter 7.124, Deleting Section 13.10.670, Amending the Commercial Uses Chart and the Definitions of the Zoning Ordinance and Enacting New Chapter 7.124 all Relating to Medical Marijuana

Dear Chairman Coonerty and Members of the Board of Supervisors:

The Union of Medical Marijuana Patients ("UMMP") is pleased to comment on the County of Santa Cruz ("County") proposed ordinance regarding medical marijuana ("Ordinance" or "Project"). UMMP is in receipt of the County's Staff Report dated September 5, 2013 for the Ordinance, in which the County concludes that the Project is exempt from the California Environmental Quality Act ("CEQA")." This letter notifies the County that the Ordinance is not exempt from CEQA and outlines the foreseeable environmental effects associated with the proposed Ordinance requiring review and mitigation under CEQA. Because the Ordinance is not exempt, the County must conduct an Initial Study pursuant to §15063 of the California Public Resources Code.

About UMMP

I would first like to introduce my organization. UMMP is a not-for-profit civil rights organization that is devoted to defending and asserting the rights of medical cannabis patients. UMMP promotes a model of legally compliant medical cannabis patient associations and has developed a self-regulatory product, AGSite Secure, to ensure all Californians using medical cannabis and forming patient associations have the opportunity to do so with a clear and unambiguous understanding of the law. UMMP is committed to sensible regulations for patient associations and their dispensaries, responsible actions of patients and cooperation with law enforcement.

321 1/2 E. 1st Street, Suite 200, Los Angeles, CA 90012
213-626-2730 (Phone) 213-613-1443 (Fax)
UnionMMP.org

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The Proposed Ordinance

Among other things, the Ordinance would regulate "medical marijuana businesses" (herein after referred to as "patient associations") by banning such businesses, but then granting immunity from the ban to certain businesses that meet certain specified operating requirements. The Staff Report indicates that only five of the existing patient associations currently operating in the County will be granted limited immunity. Also, the Ordinance prohibits the cultivation of marijuana, but then grants immunity to certain cultivation operations that adhere to specified requirements. Among other things, Section 7.124.070 of the Ordinance establishes the following regulations regarding cultivation:

A. *Cultivation within a residence.* Cultivation limited to no more than one hundred (100) square feet.
B. *Indoor cultivation other than a residence.* Cultivation limited to three hundred (300) square feet (and perhaps less depending on the circumstances).
C. *Small Outdoor Cultivation.* Outdoor cultivation at a location that is less than one acre in size limited to three hundred (300) square feet (and perhaps less depending on the circumstances).
D. *Large Outdoor Cultivation.* Cultivation at a location that is one acre in size or greater limited to one thousand (1,000) square feet or less (and perhaps depending on the circumstances). In some instances, larger cultivation sites may apply for and be granted an exemption from the Planning Director to operate a larger outdoor cultivation site.

With regard to CEQA, the County has made the following determination:

> "Planning staff have determined that the proposed ordinance will not result in a direct or reasonably foreseeable indirect physical change in the environment, pursuant to CEQA Guidelines Section 15060(c)(2) based on a determination that the ordinance would restrict medical marijuana businesses consistent with existing legal authority. Because the existing baseline of conditions is that medical marijuana businesses and cultivation are not legally authorized uses under the County's zoning ordinance and the proposed ordinance would specifically ban such businesses and cultivation, the proposed ordinance would result in no direct or reasonably foreseeable indirect physical change or impact upon the environment. In addition, the proposed ordinance is exempted under CEQA Guidelines Section 15308 as it is an action taken by a regulatory agency to enhance the environment by prohibiting rather than authorizing medical marijuana businesses and cultivation."

Staff Report, p. 5.

As explained below, the Ordinance is not exempt from CEQA under either CEQA Guidelines Section 15060(c)(2) or Section 15308.

The Ordinance is a "Project"

As an initial matter, it bears noting that the Ordinance is a "project" under CEQA. The fact that the "project" at issue is the adoption of an ordinance as opposed to a development project proposed by an applicant does not relieve the County of the obligation to undertake a review of the project under CEQA. *Rosenthal v. Board of Supervisors* (1975) 14 Cal.App.3d 815, 823 (stating that "adopting an ordinance [is] a project"); *No Oil, Inc. v. City of Los Angeles* (1974) 13 Cal.3d 68, 118 Cal.Rptr. 34 (impliedly holding that adoption of ordinance is a project within the meaning of CEQA); 60 Ops.Cal.Atty.Gen. 335 (1977) ("ordinances and resolutions adopted by a local agency are 'projects' within the meaning of CEQA"). The Attorney General Opinion issued in 1977 concluded that the following ordinances were all subject to CEQA: (1) an open-range ordinance requiring private landowners to fence out cattle; (2) an ordinance allowing construction of single family dwellings in rural areas without electricity, running water, or flush toilets; and (3) an ordinance modifying road improvement standards for new subdivisions. The bottom line is that a project need not directly affect a physical change in the environment; reasonably foreseeable indirect or secondary effects must also be analyzed. The relative inquiry is whether or not the project, or in this case, the Ordinance, will ultimately culminate in physical changes to the environment. *Id.*

As explained below, the Ordinance will unquestionably culminate in a physical change to the environment. At the very least, existing patient associations will cease to operate and will either become home to some other activities or will become vacant. Furthermore, there can be little doubt that patients who currently obtain their medication from the existing patient associations will be required to travel greater distances in order to continue to receive the treatment they need. This additional travel not only may, but will, result in a direct change in the physical environment by increasing air pollutants. No further evidence is required to establish that the County is subject to CEQA under the CEQA Guidelines § 15060(c). Any Initial Study that the County conducts must analyze these impacts before the County can adopt the Ordinance.

Additionally, it should be emphasized that "[w]hether an activity constitutes a project subject to CEQA is a categorical question respecting whether the activity is of a general kind with which CEQA is concerned, without regard to whether the activity will actually have environmental impacts." *Muzzy Ranch Co. v. Solano County Airport Land Use Commission* (2007) 41 Cal.4th 372, 381. It is well established that the enactment of a zoning ordinance such as the Ordinance proposed by the County is subject to environmental review under CEQA. *See, e.g., Concerned Citizens of Palm Desert v. Board of Supervisors* (1974) 38 Cal.App.3d 272, 283 (the "enactment and amendment of zoning ordinances" are subject to CEQA).

The Alleged Illegality of Existing Cultivation Activity and Patients Associations Does Not Render the Ordinance Exempt from CEQA Pursuant to CEQA Guidelines Section 15060(c)(2)

First of all, contrary to staff's determination, the existing legality of patient associations or cultivation of medical marijuana is not a basis for determining that the Ordinance is exempt from CEQA. Under CEQA, the environmental baseline includes numerous patient associations operating in the County.

Significantly, the legality of the existing patient associations in the City does not relieve the City of the obligation to include them in the environmental baseline. In *Riverwatch v. County of San Diego* (1999) 76 Cal. App.4th 1428, 1451, the court held that the proper baseline is the existing condition of the site, even if that condition may be the result of prior illegal activity. The court explained in *Riverwatch* that CEQA is not "the appropriate forum for determining the nature and consequence of a prior conduct of a project applicant." 76 Cal. App.4th at 1452. The decision in *Riverwatch* has been followed by other courts. *See Eureka Citizens for Responsible Government v. City of Eureka* (2007) 147 Cal. App. 4th 357, 370 (citing *Riverwatch* and stating that the "environmental impacts should be examined in light of the environment as it exists when a project is approved.").

Moreover, it is a fundamentally accepted principle that environmental impacts should be examined in light of the environment as it exists when a project is approved. (Guidelines, § 15125, subd. (a); *Bloom v. McGurk* (1994) 26 Cal. App. 4th 1307, 1315, fn. 2; *City of Carmel-by-the-Sea v. Board of Supervisors* (1986) 183 Cal. App. 3d 229, 246; *Christward Ministry v. Superior Court* (1986) 184 Cal. App. 3d 180, 190; *Environmental Planning & Information Council v. County of El Dorado* (1982) 131 Cal. App. 3d 350, 358; Remy et al., Guide to the Cal. Environmental Quality Act (10th ed. 1999) p. 165.). In this case, there are numerous patient associations operating in the County. To exclude the consideration of these patient associations on the basis that they are allegedly operating in violation of the County's zoning code is an abuse of discretion and not supported by substantial evidence.

<u>The Ordinance Creates New Environmental Harms and Therefore Is Not Exempt from CEQA as an Activity Designed to Protect the Environment Pursuant to CEQA Guidelines Section 15308</u>

Second, it should be emphasized that activities intended to protect or preserve the environment are not automatically immune from environmental review. The Guidelines provide that categorical exemptions may not be used where there is a reasonable possibility that the activity will have a significant effect on the environment (1) when "the cumulative impact of successive projects of the same type in the same place, over time is significant" (Guidelines, § 15300.2(b)), or (2) due to "unusual circumstances." (Guidelines, § 15300.2(c).) *See Dunn-Edwards Corp. Bay Area Air Quality Management Dist.* (1992) 9 Cal.App.4th 644 (overturning amendments to air district regulations designed to reduce the amount of volatile organic carbons in paint for failure to comply with CEQA); *Building Code Action v. Energy Resources Conservation & Dev. Com.* (1980) 102 Cal.App.3d 577 (adoption of emergency conservation regulations establishing double-glazing standards for new residential construction could have significant impact on air quality as result of increased glass production).

> Rulemaking proceedings cannot be found exempt, however, when the rule has the effect of weakening environmental standards.
>
> [Even a] new regulation that strengthens some environmental requirements may not be entitled to an exemption if the new requirements could result in other potentially significant effects.

California Unions for Reliable Energy v. Mojave Desert Air Quality Management Dist. (2009) 178 Cal.App.4th 1225, 1240 (quoting 2 Kostka & Zischke, *Practice Under the Cal. Environmental Quality Act*, *supra,* § 20.43, p. 981) (internal citations omitted).

> Even if a public agency meets its initial burden to show the exemption is supported by substantial evidence, it still has to defend against claims that the exemption is subject to an exception. (*Ibid.*) Thus, it is simply not the case that a city or county can circumvent CEQA merely by characterizing its ordinances as environmentally friendly and therefore exempt under the Class 7 or 8 categorical exemptions.

Save the Plastic Bag Coalition v. County of Marin (2013) 218 Cal.App.4th 209, 228. As explained below, there is no substantial evidence to support the County's conclusion that the Ordinance is exempt from CEQA pursuant to CEQA Guidelines Section 15308.

The County Has Failed to Consider the Significant Environmental Impacts of the Ordinance

The County has failed to analyze the reasonably foreseeable consequences of increased indoor cultivation of medical marijuana resulting from the Ordinance. The Ordinance may result in qualified patients resorting to cultivating medical marijuana due to the reduced number of patient associations and this cultivation may take place indoors. This is because patients will not be able to obtain medical marijuana from patient associations that will be forced to close under the Ordinance. The environmental impacts associated with indoor cultivation may be significant. A recent study entitled *The Carbon Footprint of Indoor Cannabis Production*, published in The International Journal of the Political, Economic, Planning, Environmental and Social Aspects Energy, detailed the environmental impacts of indoor cannabis cultivation (Exhibit 1). The following are highlights from the study:

- Indoor cannabis production utilizes highly energy intensive processes to control environmental conditions during cultivation.
- Indoor cannabis production results in energy expenditures of $6 billion each year--6-times that of the entire U.S. pharmaceutical industry--with electricity use equivalent to that of 2 million average U.S. homes. This corresponds to 1% of national electricity consumption or 2% of that in households.
- One average kilogram of cannabis is associated with 4600 kg of carbon dioxide emissions (greenhouse-gas pollution) to the atmosphere, or that of 3 million average U.S. cars when aggregated across all national production.
- In California, the top-producing state, indoor cultivation is responsible for about 3% of all electricity use or 9% of household use.
- The unchecked growth of electricity demand in this sector confounds energy forecasts and obscures savings from energy efficiency programs and policies.
- Shifting cultivation outdoors can nearly eliminate energy use for the cultivation process.

This study was the product of previous research conducted by the same author (Exhibit 2). Additional research has confirmed these impacts (Exhibit 3). The County has completely failed to analyze the Ordinance's reasonably foreseeable environmental impacts, specifically the impacts of indoor cultivation. The Ordinance is not exempt from CEQA and there are significant environmental impacts, as outlined in the aforementioned studies, that the County has failed to

mitigate that implicate agriculture, air quality, water quality, traffic, land use planning, etc. Consider the following facts:

- Assuming medical marijuana patients comprise 2% of the County population then there are 5,335 patients in the County
- Existing patients may establish up to 5,335 home cultivation sites in the County to meet their personal needs
- Assuming patients use 1 ounce of marijuana per month, then 4,001 pounds of cannabis per year would need to be cultivated to meet patient needs in the County

Besides forcing many individual patients to establish their own cultivation sites, the Ordinance will require the five patients associations authorized to continue to operate in the County to establish many new cultivation sites to meet greater patient demands. However, because the Ordinance establishes strict limits on how many square feet can be cultivated on a property, multiple new cultivation sites will be required for each patient association. Construction and agricultural activities are associated with each cultivation site which the County has failed to analyze or consider. Further, agricultural workers will need to travel between sites on a daily basis causing increases in greenhouse gas, air pollutants and traffic. Again, the County has failed to consider these environmental impacts. Moreover, the County's existing environmental regulations were not designed to regulate this unique agricultural activity and do not mitigate the development impacts associated with each new cultivation site.

The establishment of thousands of new cultivation sites and the cultivation of medical marijuana indoors, including in single family residential zones, implicate significant environmental concerns and require meaningful review under CEQA. Obviously, cultivation sites will proliferate as a result of the Ordinance and additional waste water will be created as a result of these cultivation activities. Moreover, additional waste plant material (a.k.a bio-waste) will be created that must be disposed of properly. However, because these activities may take place indoors, the proper means of disposal is unclear and the County has failed to mitigate the foreseeable environmental impacts. Indeed, state regulatory agencies, including, for example, the Central Valley Regional Water Quality Control Board (CVRWQCB), have recognized the environmental consequences of cultivation and recently issued a notice and fact sheet to cultivators in an effort to prevent environmental damage. *See* Fact Sheet attached as Exhibit 4.

Further, and as noted above, there will also be an increase in the electrical consumption that will be required. These facts are compelling and demonstrate potential significant environmental effects in terms of (1) Greenhouse Gas Emissions, (2) Hazards & Hazardous Materials, (3) Hydrology/Water Quality, and (4) Utilities/Service Systems.

It is clear that the Ordinance may result in existing patients cultivating their own medical marijuana and much of that activity will take place indoors because the average patient may not live in a place where outdoor cultivation is feasible. The Ordinance will also have another unintended consequence – it will cluster these new cultivation sites within the areas of the County where patients reside, including single family residential zones. There are significant environmental concerns associated with the cultivation of almost all medical marijuana by patients in residential zones. For example, significant increases in electrical and water consumption may be required by cultivation of medical marijuana indoors. Further, potentially

hazardous waste associated with fertilizing and harvesting marijuana plants may be created. Odor associated with cultivation may also be a concern. Allowing larger cultivation sites and more patient associations in the County provides for economies of efficiency that can reduce the inevitable environmental impacts of an inherently agricultural activity. The County has failed to mitigate the impacts associated with the Ordinance to ensure that they are "less than significant."

Further, the County has failed to consider the traffic impacts associated the reduction in the total number of patient associations in the County. Because patient associations are necessarily comprised of patients and caregivers that live in the community (and presumably in residential areas), these individuals (who have a medical need) may have to travel much further to visit the five patient associations that will be allowed to operate under the Ordinance. Patients will likely travel by car longer distances to visit these patient associations and the County has failed to consider the traffic impacts that may result.

Conclusion

While the above discussion is not intended to be an exhaustive list of the reasonably foreseeable indirect or secondary effects of the Ordinance, it is illustrative of the types of impacts that the County must analyze. A fair argument has been outlined regarding the significant environmental effects of the Ordinance. As such, the County is compelled to prepare an Initial Study pursuant to §15063 of the California Public Resources Code as there are no applicable exemptions established in Division 13, Articles 18 or 19 of the California Public Resources Code. The Ordinance will have a significant effect on the environment and the County has failed to mitigate these impacts as required under CEQA. As such, the County is required to prepare an Environmental Impact Report. CEQA Guidelines, § 15002, subd. (k); *No Oil, Inc. v. City of Los Angeles* (1974) 13 Cal.3d 68, 74 (If the initial study shows that the project may have a significant effect, the lead agency takes the third step and prepares an Environmental Impact Report.)

Regards,

/s/ James Shaw

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Executive Director

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Exhibit 1

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The carbon footprint of indoor *Cannabis* production

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ABSTRACT

The emergent industry of indoor *Cannabis* production – legal in some jurisdictions and illicit in others – utilizes highly energy intensive processes to control environmental conditions during cultivation. This article estimates the energy consumption for this practice in the United States at 1% of national electricity use, or $6 billion each year. One average kilogram of final product is associated with 4600 kg of carbon dioxide emissions to the atmosphere, or that of 3 million average U.S. cars when aggregated across all national production. The practice of indoor cultivation is driven by criminalization, pursuit of security, pest and disease management, and the desire for greater process control and yields. Energy analysts and policymakers have not previously addressed this use of energy. The unchecked growth of electricity demand in this sector confounds energy forecasts and obscures savings from energy efficiency programs and policies. While criminalization has contributed to the substantial energy intensity, legalization would not change the situation materially without ancillary efforts to manage energy use, provide consumer information via labeling, and other measures. Were product prices to fall as a result of legalization, indoor production using current practices could rapidly become non-viable.

1. Introduction

On occasion, previously unrecognized spheres of energy use come to light. Important historical examples include the pervasive air leakage from ductwork in homes, the bourgeoning energy intensity of computer datacenters, and the electricity "leaking" from billions of small power supplies and other equipment. Intensive periods of investigation, technology R&D, and policy development gradually ensue in the wake of these discoveries. The emergent industry of indoor *Cannabis* production appears to have joined this list.[1]

This article presents a model of the modern-day production process – based on public-domain sources – and provides first-order national scoping estimates of the energy use, costs, and greenhouse-gas emissions associated with this activity in the United States. The practice is common in other countries but a global assessment is beyond the scope of this report.

2. Scale of activity

The large-scale industrialized and highly energy-intensive indoor cultivation of *Cannabis* is a relatively new phenomenon, driven by criminalization, pursuit of security, pest and disease management, and the desire for greater process control and yields (U.S. Department of Justice, 2011a; World Drug Report, 2009). The practice occurs across the United States (Hudson, 2003; Gettman, 2006). The 415,000 indoor plants eradicated by authorities in 2009 (and 10.3 million including outdoor plantations) (U.S. Department of Justice, 2011a, b) presumably represent only a small fraction of total production.

Cannabis cultivation is today legal in 15 states plus the District of Columbia, although it is not federally sanctioned (Peplow, 2005). It is estimated that 24.8 million Americans are eligible to receive a doctor's recommendation to purchase or cultivate *Cannabis* under existing state laws, and approximately 730,000 currently do so (See Change Strategy, 2011). In California alone, 400,000 individuals are currently authorized to cultivate *Cannabis* for personal medical use, or sale for the same purpose to 2100 dispensaries (Harvey, 2009). Approximately 28.5 million people in the United States are repeat consumers, representing 11% of the population over the age of 12 (U.S. Office of National Drug Control Policy, 2011).

Cultivation is also substantial in Canada. An estimated 17,500 "grow" operations in British Columbia (typically located in residential buildings) are equivalent to 1% of all dwelling units Province-wide, with an annual market value of $7 billion (Easton, 2004).

Official estimates of total U.S. *Cannabis* production varied from 10,000 to 24,000 metric ton per year as of 2001, making it the nation's largest crop by value at that time (Hudson, 2003; Gettman, 2006). A recent study estimated national production at far higher levels (69,000 metric ton) (HIDTA, 2010). Even at the

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[1] This article substantively updates and extends the analysis described in Mills (2011).

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lower end of this range (chosen as the basis of this analysis), the level of activity is formidable and increasing with the demand for *Cannabis*.

No systematic efforts have previously been made to estimate the aggregate energy use of these activities.

3. Methods and uncertainties

This analysis is based on a model of typical *Cannabis* production, and the associated energy use for cultivation and transportation based on market data and first-principals buildings energy end-use modeling techniques. Data sources include equipment manufacturer data, trade media, the open literature, and interviews with horticultural equipment vendors. All assumptions used in the analysis are presented in Appendix A. The resulting normalized (per-kilogram) energy intensity is driven by the effects of indoor-environmental conditions, production processes, and equipment efficiencies.

Considerable energy use is also associated with transportation, both for workers and for large numbers of small-quantities transported and then redistributed over long distances before final sale.

This analysis reflects typical practices, and is thus intended as a "central estimate". While processes that use less energy on a per-unit-yield basis are possible, much more energy-intensive scenarios also occur. Certain strategies for lowering energy inputs (e.g., reduced illumination levels) can result in lower yields, and thus not necessarily reduce the ultimate energy-intensity per unit weight. Only those strategies that improve equipment and process energy efficiency, while not correspondingly attenuating yields would reduce energy intensity.

Due to the proprietary and often illicit nature of Cannabis cultivation, data are intrinsically uncertain. Key uncertainties are total production and the indoor fraction thereof, and the corresponding scaling up of relatively well-understood intensities of energy use per unit of production to state or national levels could result in 50% higher or lower aggregate results. Greenhouse-gas emissions estimates are in turn sensitive to the assumed mix of on- and off-grid power production technologies and fuels, as off-grid production (almost universally done with diesel generators) can – depending on the prevailing fuel mix in the grid – have substantially higher emissions per kilowatt-hour than grid power. Final energy costs are a direct function of the aforementioned factors, combined with electricity tariffs, which vary widely geographically and among customer classes. The assumptions about vehicle energy use are likely conservative, given the longer-range transportation associated with interstate distribution.

Some localities (very cold and very hot climates) will see much larger shares of production indoors, and have higher space-conditioning energy demands than the typical conditions assumed here. More in-depth analyses could explore the variations introduced by geography and climate, alternate technology configurations, and production techniques.

4. Energy implications

Accelerated electricity demand growth has been observed in areas reputed to have extensive indoor *Cannabis* cultivation. For example, following the legalization of cultivation for medical purposes (Phillips, 1998; Roth, 2005; Clapper et al., 2010) in California in 1996, Humboldt County experienced a 50% rise in per-capita residential electricity use compared to other parts of the state (Lehman and Johnstone, 2010).

Aside from sporadic news reports (Anderson, 2010; Quinones, 2010), policymakers and consumers possess little information on the energy implications of this practice. A few prior studies tangentially mentioning energy use associated with *Cannabis* production used cursory methods and under-estimate energy use significantly (Plecas et al., 2010 and Caulkins, 2010).

Driving the large energy requirements of indoor production facilities are lighting levels matching those found in hospital operating rooms (500-times greater than recommended for reading) and 30 hourly air changes (6-times the rate in high-tech laboratories, and 60-times the rate in a modern home). Resulting power densities are on the order of 2000 W/m^2, which is on a par with that of modern datacenters. Indoor carbon dioxide (CO_2) levels are often raised to 4-times natural levels in order to boost plant growth. However, by shortening the growth cycle, this practice may reduce final energy intensity.

Specific energy uses include high-intensity lighting, dehumidification to remove water vapor and avoid mold formation, space heating or cooling during non-illuminated periods and drying, pre-heating of irrigation water, generation of carbon dioxide by burning fossil fuel, and ventilation and air-conditioning to remove waste heat. Substantial energy inefficiencies arise from air cleaning, noise and odor suppression, and inefficient electric generators used to avoid conspicuous utility bills. So-called "grow houses" – residential buildings converted for *Cannabis* production – can contain 50,000 to 100,000 W of installed lighting power (Brady, 2004). Much larger facilities are also used.

Based on the model developed in this article, approximately 13,000 kW/h/year of electricity is required to operate a standard production module (a 1.2 × 1.2 × 2.4 m (4 × 4 × 8 ft) chamber). Each module yields approximately 0.5 kg (1 pound) of final product per cycle, with four or five production cycles conducted per year. A single grow house can contain 10 to 100 such modules.

To estimate national electricity use, these normalized values are applied to the lower end of the range of the aforementioned estimated production (10,000 t per year), with one-third of the activity takes place under indoor conditions. This indicates electricity use of about 20 TW/h/year nationally (including off-grid production). This is equivalent to that of 2 million average U.S. homes, corresponding to approximately 1% of national electricity consumption — or the output of 7 large electric power plants (Koomey et al., 2010). This energy, plus associated fuel uses (discussed below), is valued at $6 billion annually, with associated emissions of 15 million metric ton of CO_2 — equivalent to that of 3 million average American cars (Fig. 1 and Tables 1–3.)

Fuel is used for several purposes, in addition to electricity. The carbon dioxide injected into grow rooms to increase yields is produced industrially (Overcash et al., 2007) or by burning propane or natural gas within the grow room contributes about 1–2% to the carbon footprint and represents a yearly U.S. expenditure of $0.1 billion. Vehicle use associated with production and distribution contributes about 15% of total emissions, and represents a yearly expenditure of $1 billion. Off-grid diesel- and gasoline-fueled electric generators have per-kilowatt-hour emissions burdens that are 3- and 4-times those of average grid electricity in California. It requires 70 gallon of diesel fuel to produce one indoor *Cannabis* plant (or the equivalent yield per unit area), or 140 gallon with smaller, less-efficient gasoline generators.

In California, the top-producing state, indoor cultivation is responsible for about 3% of all electricity use, or 9% of household use.[2] This corresponds to the electricity use of 1 million average California homes, greenhouse-gas emissions equal to those from 1 million average cars, and energy expenditures of $3 billion per

[2] This is somewhat higher than estimates previously made for British Columbia, specifically, 2% of total Provincial electricity use or 6% of residential use (Garis, 2008; Bellett, 2010).

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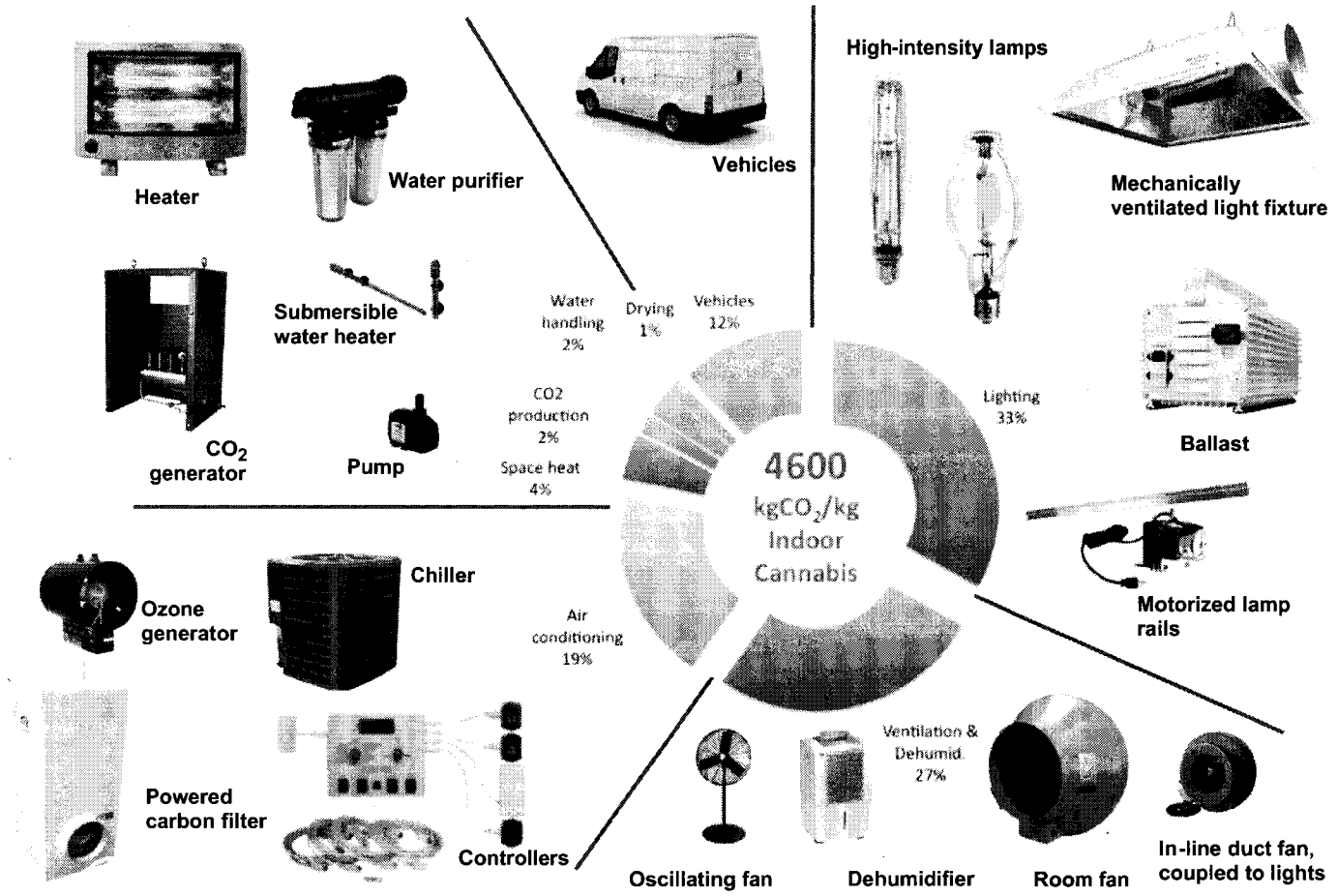

Fig. 1. Carbon footprint of indoor Cannabis production.

Table 1
Carbon footprint of indoor *Cannabis* production, by end use (average U.S conditions).

	Energy intensity (kW/h/kg yield)	Emissions factor ($kgCO_2$ emissions/kg yield)	
Lighting	2283	1520	33%
Ventilation & dehumid.	1848	1231	27%
Air conditioning	1284	855	19%
Space heat	304	202	4%
CO_2 injected to increase foliage	93	82	2%
Water handling	173	115	2%
Drying	90	60	1%
Vehicles		546	12%
Total	6074	4612	100%

Note: The calculations are based on U.S.-average carbon burdens of 0.666 kg/kW/h. "CO_2 injected to increase foliage" represents combustion fuel to make on-site CO_2. Assumes 15% of electricity is produced in off-grid generators.

year. Due to higher electricity prices and cleaner fuels used to make electricity, California incurs 50% of national energy costs but contributes only 25% of national CO_2 emissions from indoor *Cannabis* cultivation.

From the perspective of individual consumers, a single *Cannabis* cigarette represents 1.5 kg (3 pounds) of CO_2 emissions, an amount equal to driving a 44 mpg hybrid car 22 mile or running a 100-watt light bulb for 25 h, assuming average U.S. electricity emissions. The electricity requirement for one single production module equals that of an average U.S. home and twice that of an average California home. The added electricity use is equivalent to running about 30 refrigerators.

From the perspective of a producer, the national-average annual energy costs are approximately $5500 per module or $2500 per kilogram of finished product. This can represent half the wholesale value of the finished product (and a substantially lower portion at retail), depending on local conditions. For average U.S. conditions, producing one kilogram of processed *Cannabis* results in 4600 kg of CO_2 emissions to the atmosphere (and 50% more when off-grid diesel power generation is used), a very significant carbon footprint. The emissions associated with one kilogram of processed *Cannabis* are equivalent to those of driving across country 11 times in a 44-mpg car.

These results reflect typical production methods. Much more energy-intensive methods occur, e.g., rooms using 100% recirculated air with simultaneous heating and cooling, hydroponics, or energy end uses not counted here such as well-water pumps and water purification systems. Minimal information and consideration of energy use, coupled with adaptations for security and privacy (off-grid generation, no daylighting, odor and noise control) lead to particularly inefficient configurations and correspondingly elevated energy use and greenhouse-gas emissions.

The embodied energy of inputs such as soil, fertilizer, water, equipment, building materials, refinement, and retailing is not estimated here and should be considered in future assessments. The energy use for producing outdoor-grown *Cannabis* (approximately two-thirds of all production) is also not estimated here.

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Table 2
Equivalencies.

Indoor Cannabis production consumes...	**3%**	of California's total electricity, and	**9%**	of California's household electricity	**1%**	of total U.S. electricity, and	2% of U.S. household electricity
U.S. Cannabis production & distribution energy costs...	**$ 6**	Billion, and results in the emissions of	**15**	Million tonnes per year of greenhouse gas emissions (CO_2)	Equal to the emissions of	**3**	million average cars
U.S. electricity use for Cannabis production is equivalent to that of...	**1.7**	Million average U.S. homes	**or**	**7**	Average U.S. power plants		
California Cannabis production and distribution energy costs...	**$ 3**	Billion, and results in the emissions of	**4**	Million tonnes per year of greenhouse gas emissions (CO_2)	Equal to the emissions of	**1**	Million average cars
California electricity use for Cannabis production is equivalent to that of...	**1**	Million average California homes					
A typical 4 × 4 × 8-ft production module, accomodating four plants at a time, consumes as much electricity as...	**1**	Average U.S. homes, or	**2**	Average California homes	or	**29**	Average new refrigerators
Every 1 kilogram of Cannabis produced using national-average grid power results in the emissions of...	**4.3**	Tonnes of CO_2	Equiva-lent to	**7**	Cross-country trips in a 5.3 l/100 km (44 mp g) car		
Every 1 kg of Cannabis produced using a prorated mix of grid and off-grid generators results in the emissions of...	**4.6**	Tonnes of CO_2	Equiva-lent to	**8**	Cross-country trips in a 5.3 l/100 km (44 mp g) car		
Every 1 kg of Cannabis produced using off-grid generators results in the emissions of...	**6.6**	Tonnes of CO_2	Equiva-lent to	**11**	Cross-country trips in a 5.3 l/100 km (44 mp g) car		
Transportation (wholesale + retail) consumes...	**226**	Liters of gasoline per kg	or	**$ 1**	Billion dollars annually, and	**546**	Kilograms of CO_2 per kilogram of final product
One Cannabis cigarette is like driving...	**37**	km in a 5.3 l/100 km (44 mpg) car	Emitting about	**2**	kg of CO_2, which is equivalent to operating a 100-watt light bulb for	**25**	Hours
Of the total wholesale price...	**49%**	Is for energy (at average U.S. prices)					

If improved practices applicable to commercial agricultural greenhouses are any indication, such large amounts of energy are not required for indoor *Cannabis* production.[3] The application of cost-effective, commercially-available efficiency improvements to the prototypical facility modeled in this article could reduce energy intensities by at least 75% compared to the typical-efficiency baseline. Such savings would be valued at approximately $40,000/year for a generic 10-module operation (at California energy prices and $10,000/year at U.S. average prices) (Fig. 2(a)–(b). These estimated energy use reductions reflect practices that are commonplace in other contexts such as more efficient components and controls (lights, fans, space-conditioning), use of daylight, optimized air-handling systems, and relocation of heat-producing equipment out of the cultivation room. Moreover, strain choice alone results in a factor-of-two difference in yields per unit of energy input (Arnold, 2011).

[3] See, e.g., this University of Michigan resource: http://www.hrt.msu.edu/energy/Default.htm

5. Energy intensities in context

Policymakers and other interested parties will rightfully seek to put these energy indicators in context with other activities in the economy.

One can readily identify other energy end-use activities with far greater impacts than that of *Cannabis* production. For example, automobiles are responsible for about 33% of U.S. greenhouse-gas emissions (USDOE, 2009), which is100-times as much as those produced by indoor *Cannabis* production (0.3%). The approximately 20 TW/h/year estimated for indoor *Cannabis* production is about one/third that of U.S. data centers (US EPA, 2007a, 2007b), or one-seventh that of U.S. household refrigerators (USDOE, 2008). These shares would be much higher in states where *Cannabis* cultivation is concentrated (e.g., one half that of refrigerators in California (Brown and Koomey, 2002)).

On the other hand, this level of energy use is high in comparision to that used for other indoor cultivation practices, primarily owing to the lack of daylighting. For comparison, the energy intensity of Belgian greenhouses is estimated at approximately 1000 MJ/m^2 (De Cock and Van Lierde, No date), or about 1% that estimated here for indoor *Cannabis* production.

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Table 3
Energy indicators (average U.S. conditions).

	per cycle, per production module	per year, per production module	
Energy use			
Connected load		3,225	(watts/module)
Power density		2,169	(watts/m^2)
Elect	2756	12,898	(kW/h/module)
Fuel to make CO_2	0.3	1.6	(GJ)
Transportation fuel	27	127	(Gallons
On-grid results			
Energy cost	846	3,961	$/module
Energy cost		1,866	$/kg
Fraction of wholesale price		47%	
CO_2 emissions	1936	9,058	kg
CO_2 emissions		4,267	kg/kg
Off-grid results (diesel)			
Energy cost	1183	5,536	$/module
Energy cost		2,608	$/kg
Fraction of wholesale price		65%	
CO_2 emissions	2982	13,953	kg
CO_2 emissions		6,574	$kgCO_2/kg$
Blended on/off grid results			
Energy cost	897	4,197	$/module
Energy cost		1,977	$/kg
Fraction of wholesale price		49%	
CO_2 emissions	2093	9,792	kg
CO_2 emissions		4,613	$kgCO_2/kg$
Of which, indoor CO_2 production	9	42	$kgCO_2$
Of which, vehicle use			
Fuel use			
During production		79	Liters/kg
Distribution		147	Liters/kg
Cost			
During production		77	$/kg
Distribution		143	$/kg
Emissions			
During production		191	$kgCO_2/kg$
Distribution		355	$kgCO_2/kg$

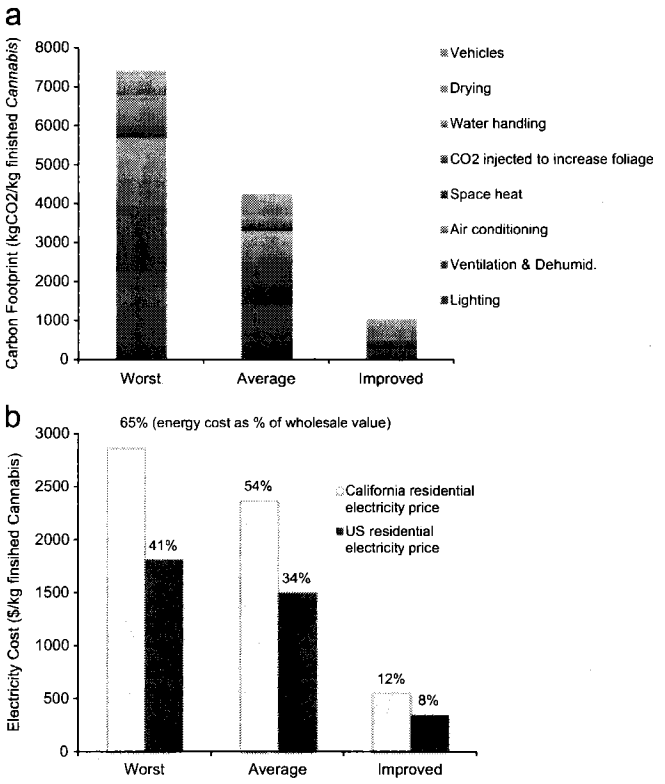

Fig. 2. Carbon footprint and energy cost for three levels of efficiency. (a) Indoor cannabis: carbon footprint. (b) Indoor cannabis: electricity cost. Assumes a wholesale price of $4400/kg. Wholesale prices are highly variable and poorly documented.

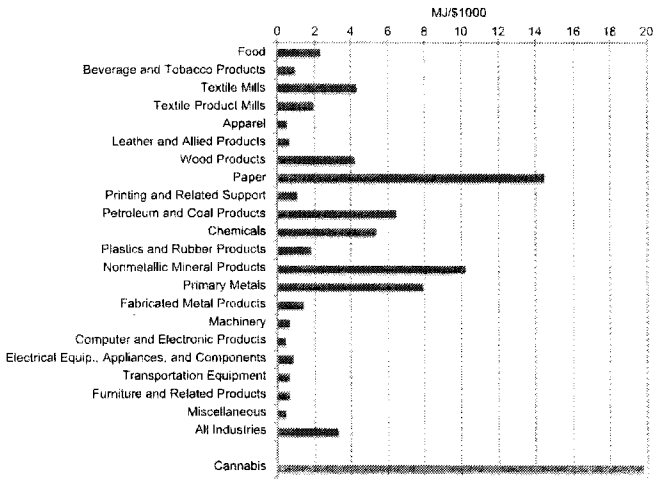

Fig. 3. Comparative energy intensities, by sector (2006).

Energy intensities can also be compared to those of other sectors and activities.

- Pharmaceuticals — Energy represents 1% of the value of U.S. pharmaceutical shipments (Galitsky et al., 2008) versus 50% of the value of Cannabis wholesale prices. The U.S. "Pharma" sector uses $1 billion/year of energy; Indoor Cannabis uses $6 billion.
- Other industries — Defining "efficiency" as how much energy is required to generate economic value, Cannabis comes out the highest of all 21 industries (measured at the three-digit SIC level). At ~20 MJ per thousand dollars of shipment value (wholesale price), Cannabis is followed next by paper (~14), nonmetallic mineral products (~10), primary metals (~8), petroleum and coal products (~6), and then chemicals (~5) (Fig. 3). However, energy intensities are on a par with *Cannabis* in various subsectors (e.g., grain milling, wood products, rubber) and exceed those of *Cannabis* in others (e.g., pulp mills).
- Alcohol — The energy used to produce one marijuana cigarette would also produce 18 pints of beer (Galitsky et al., 2003).
- Other building types — Cannabis production requires 8-times as much energy per square foot as a typical U.S. commercial building (4x that of a hospital and 20x that of a building for religious worship), and 18-times that of an average U.S. home (Fig. 4).

6. Outdoor cultivation

Shifting cultivation outdoors can nearly eliminate energy use for the cultivation process. Many such operations, however, require water pumping as well as energy-assisted drying techniques. Moreover, vehicle transport during production and distribution remains part of the process, more so than for indoor operations.

A common perception is that the potency of *Cannabis* produced indoors exceeds that of that produced outdoors, leading

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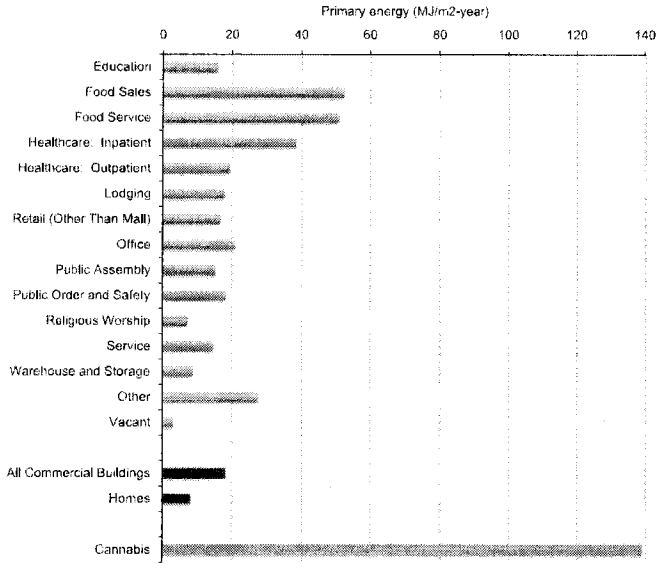

Fig. 4. Comparative energy intensities, by U.S. building type (2003).

consumers to demand *Cannabis* produced indoors. Federal sources (National Drug Intelligence Center, 2005) as well as independent testing laboratories (Kovner, 2011) actually find similar potencies when best practices are used.

Illegal clearing of land is common for multi-acre plantations, and, depending on the vegetation type, can accordingly mobilize greenhouse-gas emissions. Standing forests (a worst-case scenario) hold from 125 to 1500 t of CO_2 per hectare, depending on tree species, age, and location (National Council for Air and Soil Improvement, 2010). For biomass carbon inventories of 750 t/ha and typical yields (5000 kg/ha) (UNODC, 2009), associated biomass-related CO_2 emissions would be on the order of 150 kg CO_2/kg *Cannabis* (for only one harvest per location), or 3% of that associated with indoor production. These sites typically host on the order of 10,000 plants, although the number can go much higher (Mallery, 2011). When mismanaged, the practice of outdoor cultivation imposes multiple environmental impacts aside from energy use. These include deforestation; destruction of wetlands, runoff of soil, pesticides, insecticides, rodenticides, and human waste; abandoned solid waste; and unpermitted impounding and withdrawals of surface water (Mallery, 2011; Revelle, 2009). These practices can compromise water quality, fisheries, and other ecosystem services.

7. Policy considerations

Current indoor *Cannabis* production and distribution practices result in prodigious energy use, costs, and unchecked greenhouse-gas pollution. While various uncertainties exist in the analysis, the overarching qualitative conclusions are robust. More in-depth analysis and greater transparency of the energy impacts of this practice could improve decision-making by policymakers and consumers alike.

There is little, if any, indication that public policymakers have incorporated energy and environmental considerations into their deliberations on *Cannabis* production and use. There are additional adverse impacts of the practice that merit attention, including elevated moisture levels associated with indoor cultivation that can cause extensive damage to buildings,[4] as well as electrical fires caused by wiring out of compliance with safety codes (Garis, 2008). Power theft is common, transferring those energy costs to the general public (Plecas et al., 2010). As noted above, simply shifting production outdoors can invoke new environmental impacts if not done properly.

Energy analysts have also not previously addressed the issue. Aside from the attention that any energy use of this magnitude normally receives, the hidden growth of electricity demand in this sector confounds energy forecasts and obscures savings from energy efficiency programs and policies. For example, Auffhammer and Aroonruengsawat (2010) identified a

[4] For observations from the building inspectors community, see http://www.nachi.org/marijuana-grow-operations.htm

Table A1
Configuration, environmental conditions, set-points.

Production parameters		
Growing module	1.5	m^2 (excl. walking area)
Number of modules in a room	10	
Area of room	22	m^2
Cycle duration	78	days
Production continuous throughout the year	4.7	cycles
Illumination	Leaf phase	Flowering phase
Illuminance	25 klux	100 klux
Lamp type	Metal halide	High-pressure sodium
Watts/lamp	600	1000
Ballast losses (mix of magnetic & digital)	13%	0.13
Lamps per growing module	1	1
Hours/day	18	12
Days/cycle	18	60
Daylighting	None	none
Ventilation		
Ducted luminaires with "sealed" lighting compartment	150	CFM/1000 W of light (free flow)
Room ventilation (supply and exhaust fans)	30	ACH
Filtration	Charcoal filters on exhaust; HEPA on supply	
Oscilating fans: per module, while lights on	1	
Water		
Application	151	liters/room-day
Heating	Electric submersible heaters	
Space conditioning		
Indoor setpoint — day	28	C
Indoor setpoint — night	20	C
AC efficiency	10	SEER
Dehumidification	7x24	hours
CO_2 production — target concentration (mostly natural gas combustion in space)	1500	ppm
Electric space heating	When lights off to maintain indoor setpoint	
Target indoor humidity conditions	40–50%	
Fraction of lighting system heat production removed by luminaire ventilation	30%	
Ballast location	Inside conditioned space	
Drying		
Space conditioning, oscillating fans, maintaining 50% RH, 70–80F	7	Days
Electricity supply		
grid	85%	
grid-independent generation (mix of diesel, propane, and gasoline)	15%	

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Table A2
Assumptions and conversion factors.

Service levels		
Illuminance*	25–100	1000 lux
Airchange rates*	30	Changes per hour
Operations		
Cycle duration**	78	Days
Cycles/year**	4.7	Continuous production
Airflow**	96	Cubic feet per minute, per module
Lighting		
Leafing phase		
Lighting on-time*	18	hrs/day
Duration*	18	days/cycle
Flowering phase		
Lighting on-time*	12	hrs/day
Duration*	60	days/cycle
Drying		
Hours/day*	24	hrs
Duration*	7	days/cycle
Equipment		
Average air-conditioning age	5	Years
Air conditioner efficiency [Standards increased to SEER 13 on 1/23/2006]	10	SEER
Fraction of lighting system heat production removed by luminaire ventilation	0.3	
Diesel generator efficiency*	27%	55 kW
Propane generator efficiency*	25%	27 kW
Gasoline generator efficiency*	15%	5.5 kW
Fraction of total prod'n with generators*	15%	
Transportation: Production phase (10 modules)	25	Miles roundtrip
Daily service (1 vehicle)	78	Trips/cycle. Assume 20% live on site
Biweekly service (2 vehicles)	11.1	Trips/cycle
Harvest (2 vehicles)	10	Trips/cycle
Total vehicle miles**	2089	Vehicle miles/cycle
Transportation: Distribution		
Amount transported wholesale	5	kg per trip
Mileage (roundtrip)	1208	km/cycle
Retail (0.25oz × 5 miles roundtrip)	5668	Vehicle-km/cycle
Total**	6876	Vehicle-km/cycle
Fuel economy, typical car [a]	10.7	l/100 km
Annual emissions, typical car [a]	5195	$kgCO_2$
	0	$kgCO_2$/mile
Annual emissions, 44-mpg car**	2,598	$kgCO_2$
	0.208	$kgCO_2$/mile
Cross-country U.S. mileage	4493	km
Fuels		
Propane [b]	25	MJ/liter
Diesel [b]	38	MJ/liter
Gasoline [b]	34	MJ/liter
Electric generation mix*		
Grid	85%	share
Diesel generators	8%	share
Propane generators	5%	share
Gasoline generators	2%	share
Emissions factors		
Grid electricity — U.S. [c]	0.609	$kgCO_2$/kW/h
Grid electricity — CA [c]	0.384	$kgCO_2$/kW/h
Grid electricity — non-CA U.S. [c]	0.648	$kgCO_2$/kW/h
Diesel generator**	0.922	$kgCO_2$/kW/h
Propane generator**	0.877	$kgCO_2$/kW/h
Gasoline generator**	1.533	$kgCO_2$/kW/h
Blended generator mix**	0.989	$kgCO_2$/kW/h
Blended on/off-grid generation — CA**	0.475	$kgCO_2$/kW/h
Blended on/off-grid generation — U.S.**	0.666	$kgCO_2$/kW/h
Propane combustion	63.1	$kgCO_2$/MBTU
Prices		
Electricity price — grid (California — PG&E) [d]	0.390	per kW/h (Tier 5)
Electricity price — grid (U.S.) [e]	0.247	per kW/h
Electricity price — off-grid**	0.390	per kW/h
Electricity price — blended on/off — CA**	0.390	per kW/h
Electricity price — blended on/off — U.S.**	0.268	per kW/h
Propane price [f]	0.58	$/liter
Gasoline price — U.S. average [f]	0.97	$/liter
Diesel price — U.S. average [f]	1.05	$/liter
Wholesale price of Cannabis [g]	4,000	$/kg
Production		
Plants per production module*	4	
Net production per production module [h]	0.5	kg/cycle
U.S. production (2011) [i]	10,000	metric tonnes/y
California production (2011) [i]	3,902	metric tonnes/y
Fraction produced indoors [i]	33%	
U.S. indoor production modules**	1,570,399	
Calif indoor production modules**	612,741	
Cigarettes per kg**	3,000	
Other		
Average new U.S. refrigerator	450	kW/h/year
	173	$kgCO_2$/year (U.S. average)
Electricity use of a typical U.S. home — 2009 [j]	11,646	kW/h/year
Electricity use of a typical California home — 2009 [k]	6,961	kW/h/year

Notes:
* Trade and product literature; interviews with equipment vendors.
** Calculated from other values.
Notes for Table A2.
[a]. U.S. Environmental Protection Agency., 2011.
[b]. *Energy conversion factors*, U.S. Department of Energy, http://www.eia.doe.gov/energyexplained/index.cfm?page=about_energy_units, [Accessed February 5, 2011].
[c]. United States: (USDOE 2011); California (Marnay et al., 2002).
[d]. Average prices paid in California and other states with inverted-block tariffs are very high because virtually all consumption is in the most expensive tiers. Here the PG&E residential tariff as of 1/1/11, Tier 5 is used as a proxy for California http://www.pge.com/tariffs/ResElecCurrent.xls, (Accessed February 5, 2011). In practice a wide mix of tariffs apply, and in some states no tier structure is in place, or the proportionality of price to volume is nominal.
[e]. State-level residential prices, weighted by *Cannabis* production (from Gettman. 2006) with actual tariffs and U.S. Energy Information Administration, "Average Retail Price of Electricity to Ultimate Customers by End-Use Sector, by State", http://www.eia.doe.gov/electricity/epm/table5_6_a.html, (Accessed February 7, 2011)
[f]. U.S. Energy Information Administration, Gasoline and Diesel Fuel Update (as of 2/14/2011) – see http://www.eia.gov/oog/info/gdu/gasdiesel.asp Propane prices – http://www.eia.gov/dnav/pet/pet_pri_prop_a_EPLLPA_PTA_dpgal_m.htm, (Accessed April 3, 2011).
[g]. Montgomery, 2010.
[h]. Toonen et al., 2006); Plecas et al., 2010.
[i]. *Total Production*: The lower value of 10,000 t per year is conservatively retained. Were this base adjusted to 2011 values using 10.9%/year net increase in number of consumers between 2007 and 2009 per U.S. Department of Health and Human Services (2010), the result would be approximately 17 million tonnes of total production annually (indoor and outdoor). *Indoor Share of Total Production*: The three-fold changes in potency over the past two decades, reported by federal sources, are attributed at least in part to the shift towards indoor cultivation See http://www.justice.gov/ndic/pubs37/37035/national.htm and (Hudson, 2003). A weighted-average potency of 10% THC (U.S. Office of Drug Control Policy, 2010) reconciled with assumed 7.5% potency for outdoor production and 15% for indoor production implies 33.3%::67.7% indoor::outdoor production shares. For reference, as of 2008, 6% of eradicated plants were from indoor operations, which are more difficult to detect than outdoor operations. A 33% indoor share, combined with per-plant yields from Table 2, would correspond to a 4% eradication success rate for the levels reported (415,000 indoor plants eradicated in 2009) by the U.S. Drug Enforcement Agency (http://www.justice.gov/dea/programs/marijuana.htm). Assuming 400,000 members of medical Cannabis dispensaries in California (each of which is permitted to cultivate), and 50% of these producing in the generic 10-module room assumed in this analysis, output would slightly exceed this study's estimate of total statewide production. In practice, the vast majority of indoor production is no doubt conducted outside of the medical marijuana system.
[j]. Total U.S. electricity sales: U.S. energy information administration, "retail sales of electricity to ultimate customers: Total by end-use sector" http://www.eia.gov/cneaf/electricity/epm/table5_1.html, (Accessed March 5, 2011)
[k]. California Energy Commission, 2009; 2011.

statistically significant, but unexplained, increase in the growth rate for residential electricity in California during the years when indoor *Cannabis* production grew as an industry (since the mid-1990s).

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ıergy pe	Penetration	Rating (Watts or %)	Number of 4 × 4 × 8-ft production modules served	Input energy per module	Units	Hours/day (leaf phase)	Hours/day (flower phase)	Days/cycle (leaf phase)	Days/cycle (flower phase)	kW/h/cycle	kW/h/year per production module
ect	100%	1,000	1	1,000	W		12		60	720	3,369
ect	100%	13%	1	130	W		12		60	94	438
ect	100%	600	1	600	W	18		18		194	910
ect	100%	0	1	78	W	18		18		25	118
ect	5%	6	1	0.3	W	18	12	18	60	0	1
ect	50%	10	10	1	W	24	24	18	60	2	9
ect	100%	454	10	45	W	18	12	18	60	47	222
ect	100%	242	8	30	W	18	12	18	60	31	145
ect	100%	242	8	30	W	18	12	18	60	31	145
ect	100%	130	1	130	W	24	24	18	60	242	1,134
ect	100%	1,035	4	259	W	24	24	18	60	484	2,267
ect	50%	10	10	1	W	24	24	18	60	2	9
	90%	1,850	10	167	W	6	12	18	60	138	645
ect	50%	100	10	5	W	18	12	18	60	5	24
ect	100%										
ect	5%	115	10	0.6	W	18	12	18	60	1	3
ect	100%	104	0	26	W	18	12	18	60	27	126
ect	100%	50	10	5	W	24	24	18	60	9	44
ect	50%	300	10	15	W	18	12	18	60	19	89
ect	20%	1,438	10	29	W	24	24	18	60	54	252
ect	90%	23	10	2.1	W	24	24	18	60	4	18
ect	100%	100	10	10	W	2	2	18	60	2	7
ect	25%	20	10	1	W	24	24	18	60	1	4
ect	75%	1,035	10	78	W		24		7	13	61
ect	100%	130	5	26	W		24		7	4	20
ect	75%	1,850	10	139	W		24		7	23	109
ect										2,174	10,171
			10	420	W					583	2,726
			10		W					259	1,212
ect	100%	1,277	10		W					239	1,119
ect	100%	452	10		W					85	396
ect	45%	1,118	17		W	18	12	18	60	—	—
ect				3,225	W					2,756	12,898

iits	Technology Mix	Rating (BTU/h)	Number of 4 × 4 × 8-ft production modules served	Input energy per module		Hours/day (leaf phase)	Hours/day (flower phase)	Days/cycle (leaf phase)	Days/cycle (flower phase)	GJ or $kgCO_2$/cycle	GJ or $kgCO_2$/ year
opane /CO_2	45%	11,176	17	707	kJ/h	18	12	18	60	0.3	1.5
										20	93
	5%		1	0.003	liters CO_2/hr	18	12	18	60	0.6	2.7
CO_2										2	10

For *Cannabis* producers, energy-related production costs have historically been acceptable given low energy prices and high product value. As energy prices have risen and wholesale commodity prices fallen, high energy costs (now 50% on average of wholesale value) are becoming untenable. Were product prices to fall as a result of legalization, indoor production could rapidly become unviable.

For legally sanctioned operations, the application of energy performance standards, efficiency incentives and education, coupled with the enforcement of appropriate construction codes could lay a foundation for public-private partnerships to reduce undesirable impacts of indoor *Cannabis* cultivation.[5] There are early indications of efforts to address this.[6] Were such operations to receive some form of independent certification and product labeling, environmental impacts could be made visible to otherwise unaware consumers.

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Appendix A

See Tables A1–A3.

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Exhibit 2

ENERGY UP IN SMOKE

THE CARBON FOOTPRINT OF INDOOR CANNABIS PRODUCTION

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April 5, 2011

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* The research described in this report was conducted and published independently by the author, a long-time energy analyst and Staff Scientist at the Lawrence Berkeley National Laboratory, University of California. Scott Zeramby provided valuable insights into technology characteristics, equipment configurations, and market factors that influence energy utilization.

The report can be downloaded from: http://evan-mills.com/energy-associates/Indoor.html

On occasion, previously unrecognized spheres of energy use come to light. Important examples include the pervasive air leakage from ductwork in homes, the bourgeoning energy intensity of computer datacenters, and the electricity "leaking" from millions of small power supplies and other equipment. Intensive periods of investigation, technology R&D, and policy development gradually ensue in the wake of these discoveries.

The emergent industry of indoor Cannabis production appears to have joined the list. This report presents a model of the modern-day production process—based on public sources and equipment vendor data—and provides national scoping estimates of the energy use, costs, and greenhouse-gas emissions associated with this activity in the United States.[1]

Large-scale industrialized and highly energy-intensive indoor cultivation of Cannabis is a relatively new phenomenon, driven by criminalization, pursuit of security, and the desire for greater process control and yields.[2,3] The practice occurs in every state,[4] and the 415,000 indoor plants eradicated in 2009[5] represent only the tip of the iceberg.

Aside from sporadic news reports,[6,7] policymakers and consumers possess little information on the energy implications of this practice.[8] Substantially higher electricity demand growth is observed in areas reputed to have extensive indoor Cannabis cultivation. For example, following the legalization of cultivation for medical purposes in California in 1996, Humboldt County experienced a 50% rise in per-capita residential electricity use compared to other areas.[9] Cultivation is today legal in 17 states, albeit not federally sanctioned. In California, 400,000 individuals are authorized to grow Cannabis for personal medical use, or sale to 2,100 dispensaries.[10] Official estimates of total U.S. production varied from 10,000 to 24,000 metric tons per year in 2001,[4] making it the nation's largest crop by value.[11] As of 2006, one third of national indoor production was estimated to occur in California.[12] Based on a rising number of consumers (6.6% of U.S. population above the age of 12),[13] national production in 2011 is estimated for the purposes of this study at 17,000 metric tons, one-third occurring indoors.[14]

Driving the large energy requirements of indoor production facilities are lighting levels matching those found in hospital operating rooms (500-times greater than recommended for reading) and 30 hourly air changes (6-times the rate in high-tech laboratories, and 60-times the rate in a modern home). Resulting electricity intensities are 200 watts per square foot, which is on a par with modern datacenters. Indoor carbon dioxide (CO_2) levels are often raised to four-times natural levels in order to boost plant growth.

Specific energy uses include high-intensity lighting, dehumidification to remove water vapor, space heating during non-illuminated periods and drying, irrigation water pre-heating, generation of CO_2 by burning fossil fuel, and ventilation and air-conditioning to remove waste heat. Substantial energy inefficiencies arise from air cleaning, noise and odor suppression, and inefficient electric generators used to avoid conspicuous utility bills.

Based on these operational factors, the energy requirements to operate a standard production module—a 4x4x8 foot chamber—are approximately 13,000 kWh/year of electricity and 1.5×10^6 BTU/year of fossil fuel. A single grow house can contain 10 or more such modules. Power use scales to about 20 TWh/year nationally (including off-grid production and power theft), equivalent to that of 2 million average U.S. homes. This corresponds to 1% of national electricity consumption or 2% of that in households—or the output of 7 large electric power plants.[15] This energy, plus transportation fuel, is valued at $5 billion annually, with associated emissions of 17 million metric tons of CO_2—equivalent to that of 3 million average American cars. (See Figure 1 and Tables 1-5.)

Fuel is used for several purposes, in addition to electricity. Carbon dioxide, generated industrially[16] or by burning propane or natural gas, contributes about 2% to the carbon footprint. Vehicle use for production and distribution contributes about 15% of total emissions, and represents a yearly expenditure of $1 billion. Off-grid diesel- and gasoline-fueled electric generators have emissions burdens that are three- and four-times those of average grid electricity in California. It requires 70 gallons of diesel fuel to produce one indoor Cannabis plant, or 140 gallons with smaller, less-efficient gasoline generators.

In California, the top-producing state, indoor cultivation is responsible for about 3% of all electricity use or 8% of household use, somewhat higher than estimates previously made for British Columbia.[17] This corresponds to the electricity use of 1 million average California homes, greenhouse-gas emissions equal to those from 1 million average cars, and energy expenditures of $3 billion per year. Due to higher electricity prices and cleaner fuels used to make electricity, California incurs 70% of national energy costs but contributes only 20% of national CO_2 emissions from indoor Cannabis cultivation.

From the perspective of individual consumers, a single Cannabis cigarette represents 2 pounds of CO_2 emissions, an amount equal to running a 100-watt light bulb for 17 hours assuming average U.S. electricity emissions (or 30 hours on California's cleaner grid). The emissions associated with one kilogram of processed Cannabis are equivalent to those of driving across country 5 times in a 44-mpg car. One single production module doubles the electricity use of an average U.S. home and triples that of an average California home. The added electricity use is equivalent to running about 30 refrigerators. Producing one kilogram of processed Cannabis results in 3,000 kilograms of CO_2 emissions.

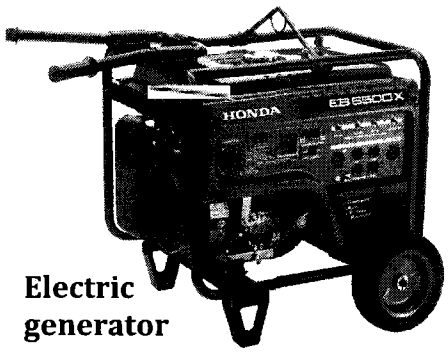
The energy embodied in the production of inputs such as fertilizer, water, equipment, and building materials is not estimated here and should be considered in future assessments.

Minimal information and consideration of energy use, coupled with adaptations for security and privacy, lead to particularly inefficient configurations and correspondingly elevated energy use and greenhouse-gas emissions. If improved practices applicable to commercial agricultural greenhouses are any indication, such large amounts of energy are not required for indoor Cannabis production.[18] Cost-effective efficiency improvements of 75% are conceivable, which would yield energy savings of about $25,000/year for a generic 10-module operation. Shifting cultivation outdoors virtually eliminates energy use (aside from transport), although, when mismanaged, the practice imposes other environmental impacts.[19] Elevated moisture levels associated with indoor cultivation can cause extensive damage to buildings.[20] Electrical fires are an issue as well.[21] For legally sanctioned operations, the application of energy performance standards, efficiency incentives and education, coupled with the enforcement of appropriate construction codes could lay a foundation for public-private partnerships to reduce undesirable impacts.[22] Were compliant operations to receive some form of independent certification and product labeling, environmental impacts could be made visible to otherwise unaware consumers.

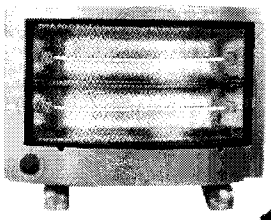
* * *

Current indoor Cannabis production and distribution practices result in prodigious energy use, costs, and greenhouse-gas pollution. The hidden growth of electricity demand in this sector confounds energy forecasts and obscures savings from energy efficiency programs and policies. More in-depth analysis and greater transparency in the energy impacts of this practice could improve decision-making by policymakers and consumers alike.

Figure 1. Carbon Footprint of Indoor Cannabis Produ

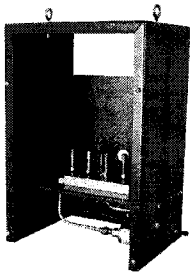


Electric generator

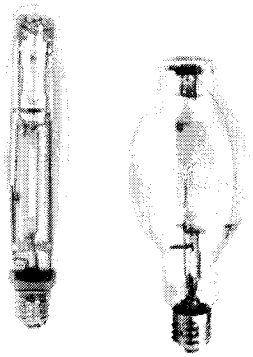


Heater

CO2 generator

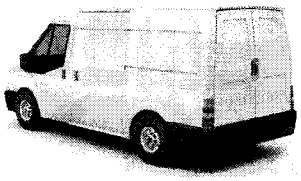


High-intensity la



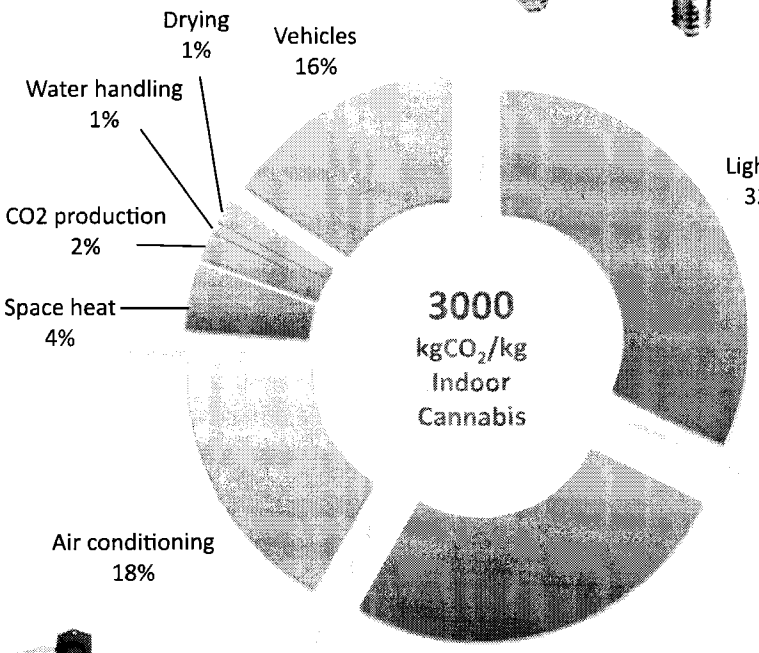
Water purifier

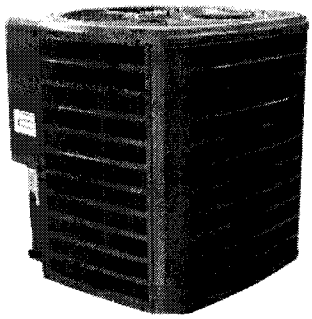
Submersible Water heater



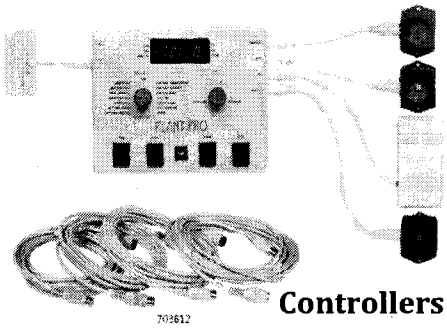
Vehicles

Pump

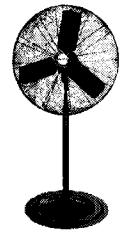




Air-conditioning

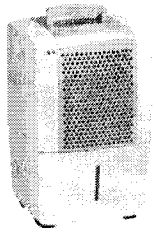


Controllers



Oscillating fan

Ventilation & Dehumid



Dehumidifier

Table 1. Configuration, Environmental Conditions, and Setpoints

Production parameters		
Growing module	16	square feet (excl. walking area)
Number of modules in a room	10	
Area of room	240	square feet
Cycle duration	78	days
Production continuous throughout the year	4.7	cycles
Illumination	*Leaf phase*	*Flowering phase*
Lamp type	Metal halide	High-pressure sodium
Watts/lamp	600	1000
Ballast losses (mix of magnetic & digital)	13%	13%
Lamps per growing module	1	1
Hours/day	18	12
Days/cycle	18	60
Daylighting	none	none
Ventilation		
Ducted luminaires with "sealed" lighting compartment	150	CFM/1000W of light (free flow)
Room ventilation (supply and exhaust fans)	30	ACH
Filtration	Charcoal filters on exhaust; HEPA on supply	
Oscilating fans: per module, while lights on	1	
Water		
Application	40	gallons/room-day
Heating	Electric submersible heaters	
	75	F
Space conditioning		
Indoor setpoint - day	82	F
Indoor setpoint - night	68-70	F
AC efficiency	10.0	SEER
Dehumidification	7x24	hours
CO2 production - target concentration (mostly natural gas combustion in space)	1500	ppm
Electric space heating	when lights off to maintain indoor setpoint	
Target indoor humidity conditions	40-50%	
Fraction of lighting system heat production removed by luminaire ventilation	30%	
Ballast location	Outside conditioned space	
Drying		
Space conditioning, oscillating fans, maintaining 50% RH, 70-80F	7	days
Electricity supply		
grid	85%	
grid-independent generation (mix of diesel, propane, and gasoline)	15%	
Vehicle use		
workers during production	2089	vehicle miles/cycle
wholesale distribution	750	vm/cycle
retail distribution (1 bounce)	3520	vm/cycle

Table 2. Assumptions & conversion factors

Service Levels		
Illuminance*	25-100,000	lux
Airchange rates*	30	changes per hour
Operations		
Cycle duration**	78	days
Cycles/year**	4.7	continuous production
Production module area*	16	square feet (excl. walking area)
Production module volume**	192	cubic feet
Airflow**	96	cubic feet per minute
Modules per room*	10	
Lighting		
Leafing phase		
Lighting on-time*	18	hrs/day
Duration*	18	days/cycle
Flowering phase		
Lighting on-time*	12	hrs/day
Duration*	60	days/cycle
Drying		
Hours/day*	24	hrs
Duration*	7	days/cycle
Equipment		
Average air-conditioning age	5	years
Air conditioner efficiency (SEER)	10	Minimum standard as of 1/2006
Fraction of lighting system heat production removed by luminaire ventilation	30%	
Diesel generator efficiency*	27%	55kW
Propane generator efficiency*	25%	27kW
Gasoline generator efficiency*	15%	5.5kW
Fraction of total prod'n with generators*	15%	
Water use [indoor]*	1	gallons/day-plant
Transportation: Production phase (10 modules)	25	miles roundtrip
Daily service (1 vehicle)	78	trips/cycle. Assume 20% live on site
Biweekly service (2 vehicles)	11	trips/cycle
Harvest (2 vehicles)	10	trips/cycle
Total vehicle miles**	2089	vehicle miles/cycle
Transportation: Distribution		
Amount transported wholesale	5	kg per trip
Mileage (roundtrip)	750	vm/cycle
Retail (0.25oz x 5 miles roundtrip)	3520	vm/cycle
Total**	4270	vm/cycle
Fuel economy, typical car [a]	22	mpg
Annual emissions, typical car [a]	5195	kg CO2
	0.416	kg CO2/mile
Annual emissions, 44-mpg car**	2598	kg CO2
	0.208	kg CO2/mile
Cross-country US mileage	2790	miles

Fuels	
Propane [b]	
Diesel [b]	
Gasoline [b]	
Electric Generation Mix*	
Grid	
Diesel generators	
Propane generators	
Gasoline generators	
Emissions Factors	
Grid electricity - US [c]	
Grid electricity - CA [c]	
Grid electricity - non-CA US [c]	
Diesel generator**	
Propane generator**	
Gasoline generator**	
Blended generator mix**	
Blended on/off-grid generation - CA**	
Blended on/off-grid generation - US**	
Propane combustion	
Prices	
Electricity price - grid (California - PG&E) [d]	
Electricity price - grid (US, excl. CA) [e]	
Electricity price - off-grid**	
Electricity price - blended on/off - CA**	
Electricity price - blended on/off - US**	
Propane Price [f]	
Gasoline Price - US average [f]	
Diesel Price - US average [f]	
Wholesale price of Cannabis [g]	
Production	
Plants per production module*	
Net production per production module [h]	
US production (2011) [i]	
California production (2011) [i]	
Fraction produced indoors [i]	
US indoor production modules**	
Calif indoor production modules**	
Cigarettes per kg**	
Other	
Average new refrigerator	
Electricity use of a typical US home - 2009 [j]	
Electricity use of a typical California home - 2009 [k]	

* trade and product literature; interviews with ec

** calculated from other values

Table 3. Carbon footprint of indoor Cannabis Production
(Average US conditions)

	kWh/kg	kgCO2 emissions/kg
Lighting	1,479	985
Ventilation & Dehumid.	1,197	797
Air conditioning	827	551
Space heat	197	131
CO_2 production	54	49
Water handling	28	19
Drying	73	48
Vehicles		479
Total	3,855	**3,059**

Note: "CO2 production" represents combustion fuel to make on-site CO2. Assumes 15% electricity is produced in off-grid generators. As the fuels used for CO2 contain moisture additional dehumidification is required (and allocated here to the CO2 energy row). Air-conditioning associated with CO2 production (as well as for lighting, ventilation, and oth incidentals) is counted in the air-conditioning category.

Table 4. Equivalencies					
Indoor Cannabis production consumes...	3%	of California's total electricity, and	8%	of California's household electricity	1%
U.S. Cannabis production & distribution energy cost...	$5	Billion, and results in the emissions of	17	million tonnes per year of greenhouse gas emissions (CO2)	equal to the emissions of
U.S. electricity use for Cannabis production is equivalent to that of...	2	million average US homes			
California Cannabis production and distribution energy cost	$3	Billion, and results in the emissions of	4	million tonnes per year of greenhouse gas emissions (CO2)	equal to the emissions of
California electricity use for Cannabis production is equivalent to that of...	1	million average California homes			
A typical 4x4x8-foot production module, accomodating four plants at a time, consumes as much electricity as...	1	average U.S. homes, or	2	average California homes	or
Every 1 kilogram of Cannabis produced using national-average grid power results in the emissions of...	2.8	tonnes of CO2	equivalent to	4.9	cross-country trips in a 44mpg car
Every 1 kilogram of Cannabis produced using a prorated mix of grid and off-grid generators results in the emissions of...	3.1	tonnes of CO2	equivalent to	5.3	cross-country trips in a 44mpg car
Every 1 kilogram of Cannabis produced using off-grid generators results in the emissions of...	4.3	tonnes of CO2	equivalent to	7.4	cross-country trips in a 44mpg car
Transportation (wholesale+retail) consumes...	52	gallons of gasoline per kg	or	$1	billion dollars annually, and
One Cannabis cigarette is like driving...	15	miles in a 44mpg car	emitting about	2	pounds of CO2, which is equivalent to operating a 100-watt light bulb for
Of the total wholesale price...	24%	is for energy (at average U.S. prices)			

Table 5. Indicators (Average US conditions)	per cycle, per production module	per year, per production module	
Energy Use			
Connected Load		3,039	watts/module
Power Density		190	watts/ft2
Elect	2,698	12,626	kWh/module
Fuel to make CO2	0.3	1.5	MBTU
Transportation fuel	37	172	gallons
On-grid results			
Energy cost	592	2,770	$/module
Energy cost		846	$/kg
Fraction of wholesale price		21%	
CO2 emissions	1,988	9,302	kg
CO2 emissions		2,840	kg/kg
Off-grid results (diesel)			
Energy cost	1,196	5,595	$/module
Energy cost		1,708	$/kg
Fraction of wholesale price		43%	
CO2 emissions	3,012	14,094	kg
CO2 emissions		4,303	kgCO2/kg
Blended on/off grid results			
Energy cost	682	3,194	$/module
Energy cost		975	$/kg
Fraction of wholesale price		24%	
CO2 emissions	2,141	10,021	kg
CO2 emissions		3,059	kgCO2/kg
Of which, indoor CO2 production	9	42	kgCO2
Of which, vehicle use			
Fuel use			
During Production		14	gallons/kg
Distribution		39	gallons/kg
Cost			
During Production		$50	$/kg
Distribution		$143	$/kg
Emissions			
During Production		124	kgCO2/kg
Distribution		355	kgCO2/kg

Table 6. Model	Energy type	Penetration	Rating	Number of 4x4x8-foot production modules served	Input energy per module	Units	Hours/day (leaf phase)	Hours/day (flower phase)	Days/cycle (leaf phase)	D
Light										
Lamps (HPS)	elect	100%	1000	1	1000	W		12		
Ballasts (losses)	elect	100%	13%	1	130	W		12		
Lamps (MH)	elect	100%	600	1	600	W	18		18	
Ballast (losses)	elect	100%	13%	1	78	W	18		18	
Motorized rail motion	elect	5%	5.5	1	0.3	W	18	12	18	
Controllers	elect	50%	10	10	1	W	24	24	18	
Ventilation and moisture control										
Luminare fans (sealed from conditioned space)	elect	100%	454	10	45	W	18	12	18	
Main room fans - supply	elect	100%	242	8.1	30	W	18	12	18	
Main room fans - exhaust	elect	100%	242	8.1	30	W	18	12	18	
Circulating fans (18")	elect	100%	130	1	130	W	24	24	18	
Dehumidification	elect	100%	1,035	4	259	W	24	24	18	
Controllers	elect	50%	10	10	1	W	24	24	18	
Spaceheat										
Resistance heat [when lights off]		90%	1,850	10	167	W	6	12	18	
Carbon Dioxide										
Parasitic electricity	elect	50%	100	10	5	W	18	12	18	
AC (see below)	elect	100%								
In-line heater	elect	5%	115	10	0.6	W	18	12	18	
Dehumidification (10% adder)	elect	50%	104	0.4	26	W	18	12	18	
Monitor/control	elect	50%	50	10	3	W	24	24	18	
Water										
Heating	elect	100%	300	10	30	W	18	12	18	
Pumping - irrigation	elect	100%	55	10	5.5	W	1	1	18	
Drying										
Dehumidification	elect	75%	1,850	10	139	W		24		
Circulating fans	elect	100%	130	5	26	W		24		
Heating	elect	75%	1,850	10	139	W		24		
Electricity subtotal	elect									
Air-conditioning										
Lighting loads										
Loads that can be remoted	elect	100%	1,180	10	118	W				
Loads that can't be remoted	elect	100%	450	10	45	W				
CO2-production heat removal	elect	50%	1,118	16.7	34	W	18	12	18	
Electricity Total	**elect**				**3,039**	**W**				

ON-SITE FUEL	Units	Technology Mix	Rating (BTU/ hour)	Number of 4x4x8-foot production modules served	Input energy per module		Hours/day (leaf phase)	Hours/day (flower phase)	Days/cycle (leaf phase)	D
On-site CO2 production										
Energy use	propane	45%	11,176	16.7	671	BTU/ho	18	12	18	
CO2 production --> emissions	kg/CO2									
Externally produced Industrial CO2		5%		1	0.011	gallonsCO2/hr	18	12	18	
Weighted-average on-site / purchased	kgCO2									
Weighted average on-site / purchased	kg CO2									

Notes for Tables

[a]. U.S. Environmental Protection Agency. "Emission Facts: Average Annual Emissions and Fuel Consumption for Passenger Cars and Light Trucks." http://www.epa.gov/oms/consumer/f00013.htm [accessed February 5, 2011]

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1. This report presents a model of typical production methodologies and associated transportation energy use. Data sources include equipment manufacturer data, trade media, the open literature, and interviews with horticultural supply vendors. All assumptions used in the analysis are presented in Table 2. The resultant normalized (per-kilogram) energy intensity is driven by the target environmental conditions, production process, and equipment efficiencies. While less energy-intensive processes are possible (either with lower per-unit-area yields or more efficient equipment and controls), much more energy-intensive scenarios are also possible (e.g., rooms using 100% recirculated air with reheat, hydroponics, and loads not counted here such as well-water pumps and water purification systems). The assumptions about vehicle energy use are likely conservative, given the longer-range transportation associated with interstate distribution. Some localities (very cold and very hot climates) will see much larger shares of production indoors, and have higher space-conditioning energy demands than the typical conditions assumed here. Some authors [See Plecas, D. J. Diplock, L. Garis, B. Carlisle, P. Neal, and S. Landry. *Journal of Criminal Justice Research,* Vol. 1 No 2., p. 1-12.] suggest that the assumption of 0.75kg yield per production module per cycle is an over-estimate. Were that the case, the energy and emissions values in this report would be even higher, which is hard to conceive. Additional key uncertainties are total production and the indoor fraction of total production (see note 14), and the corresponding scaling up of relatively well-understood intensities of energy use per unit of production to state or national levels by weight of final product. Greenhouse-gas emissions estimates are in turn sensitive to the assumed mix of on- and off-grid power production technologies and fuels, as off-grid production tends to have substantially higher emissions per kilowatt-hour than grid power. Costs are a direct function of the aforementioned factors, combined with electricity tariffs, which vary widely across the country and among customer classes. More in-depth analyses could explore the variations introduced by geography and climate, alternate technology configurations, and production techniques.
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Exhibit 3

BOTEC
Analysis Corporation

Environmental Risks and Opportunities in Cannabis Cultivation

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BOTEC Analysis Corp.
I-502 Project #430-5d
Final
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BACK OF THE ENVELOPE CALCULATIONS

Table of Contents

Executive Summary

The most important environmental cost of marijuana production (cultivation of cannabis) in the legal Washington market is likely to be energy for indoor, and to a lesser extent, greenhouse, growing. Nearly all of this energy is electricity used for lighting and ventilating, and the energy bill can amount to 1/3 of production costs. While the price of electricity provides growers a market signal for efficient production, it does not reflect the climate effect of greenhouse gas released by electricity production. Though electricity in the Pacific Northwest is some of the lowest-GHG-intensity in the US, it still has a significant "carbon footprint."

Marginal electricity demand is much more carbon-intensive than average demand, since daily peaks are usually met with natural-gas fired generation rather than less GHG-intensive "baseload" hydropower generation. Increased cannabis cultivation indoors can be a noticeable fraction (single-digit percentages) of the state's total electricity consumption. Indoor cultivation that concentrates lighting periods at night will have a much smaller climate effect than if lighting is provided during high-electric use times. Greenhouse production requires much less energy, and open cultivation an insignificant fraction of production costs.

Other environmental effects of cannabis are worth attention, including water use, fertilizer greenhouse-gas emissions, and chemical releases, but are typical of similar horticultural and agricultural operations and should not be primary concerns of the Liquor Control Board (LCB). Even the greenhouse effects are much less important than some other risks (and benefits) of a legal cannabis market. But they should be mitigated when that can be done without substantial sacrifice of other goals, as appears to be the case.

Policies available to the LCB to respond to environmental concerns about cannabis cultivation include adjusting the excise tax on indoor-cultivated marijuana to reflect about 9c per gram worth of global warming effect, labeling low-GHG marijuana as such, encouraging LED lighting development and use, allowing outdoor cultivation, making energy-efficient production a condition of licensing, and leading other state agencies in the development of better technologies and diffusion of best practices to growers. If legal cannabis production moves toward national acceptance, the importance of developing environmentally sound production practices will grow, and policies made now in Washington and Colorado, the early adopters, may shape practices in the new industry nationwide.

Introduction

This memo reviews the main environmental effects of cannabis cultivation (we do not analyze processing or distribution), emphasizing energy and climate issues with a briefer review of other considerations (water use, chemicals, etc.). We find that the predominant environmental concern in marijuana production is energy use for indoor production (less importantly for greenhouse production) and in particular the climate effects of this energy use. We then turn to the main opportunities for growers to reduce these environmental consequences, finding that the most

important is substituting greenhouse and outdoor production for indoor operations, and, for indoor production, reduction of electricity use and especially electricity use during the day. We also sketch some ways the Liquor Control Board (LCB) can encourage better environmental practice in this industry.

Indoor cannabis production is very energy-intensive compared to other products on a per-pound basis, less so per unit value. However, environmental risks from cannabis production are nowhere near as salient a part of the overall policy framework for marijuana as (for example) the explosive and toxic hazards of methamphetamine, or the environmental costs of large-scale agriculture, mining, metallurgy, and other industries. Nor should legal cannabis production, licensed and inspected, generate the variety or degree of environmental damage inflicted by illegal production (Barringer 2013). Our bottom line is that environmental considerations should not be a major component of marijuana policy, but they are worth explicit attention and policy design.

Cannabis culture

This section briefly discusses the main methods of cannabis production, in particular growing the plants from which marijuana and other psychoactive materials are derived.

The cannabis varieties of psychoactive interest are dioecious warm-temperate to subtropical annuals, grown for the flowers of the female plant. Cultivation requirements are determined by these properties and the plant's flowering response to a prolonged diurnal dark period.

Cannabis can be grown from seed, with male and female plants separated after germination, or from cuttings (clones). Rooting clones assures an all-female stand of plants and preserves the use properties of the many varieties that have been developed.

The seedlings are grown to the desired size and maturity in a *vegetative phase* and induced or allowed to flower. When unfertilized flowers reach the desired size, they are harvested for further processing. Growing can be hydroponic (in water with dissolved nutrients), in soil (usually outdoors), or in an irrigated artificial growing medium for mechanical support.

Light is provided by the sun outdoors or in a greenhouse, or with electric lighting indoors or sometimes in a greenhouse. Indoor growing requires ventilation, sometimes filtered to reduce odor, to remove heat and humidity. CO_2 may be provided to accelerate growth, usually by venting a propane or natural gas flame into the plants' enclosure

Weeds may be controlled with herbicides outdoors; pests including insects, disease, and fungus may be controlled with chemicals or mitigated with design and management of growing chambers. Cannabis can be grown organically, without chemical fertilizers or pesticides, but at higher cost and usually lower yield.

The high specific value of cannabis flowers, and the desire of illegal growers to minimize and hide the area used for cultivation, has nurtured a labor-intensive, space-concentrated practice for indoor production analogous in some ways to horticulture of orchids and other delicate and exotic plants. This practice may change significantly in a legal operating environment.

Environmental consequences of cannabis production

Energy

The most significant environmental effect of cannabis production, and the one that varies most with different production practices, is energy consumption, especially fossil energy use with climate effects from release of greenhouse gas. Indoor-grown marijuana is an energy-intensive product by weight, using on the order of 2000 kWh per pound of product (for comparison, aluminum requires only about 7 kWh per pound). However, the high unit value of marijuana (approximately $2,000/lb. at wholesale basis[1]) compared to aluminum (~$0.90/lb[2]) means energy is a much smaller fraction of product cost: accounting for the value of the products, it takes 8,000 kWh to make $1,000 worth of aluminum vs. 1,000 kWh for $1,000 of marijuana. Glass is considered an energy-intensive product, but energy costs represent only about a sixth of glass-production costs, about half the level of indoor-grown cannabis.

Total current marijuana consumption in Washington is estimated at about 160 metric tons per year; if this quantity were to be grown indoors with typical practices, marijuana cultivation would increase the state's electricity demand by about 0.8% (using 2010 as a baseline year). Mills estimates that California indoor cultivation currently uses 3% of all electricity in the state (note that California has higher electricity prices than Washington and lacks the electric-intensive industry cluster of the northwest) (Mills 2012). While precise estimates are impossible, marijuana cultivation will be a non-trivial though small component of Washington energy consumption: significant enough to be worth reducing where possible without offsetting losses on other dimensions of value.

Indoor growing

Growing marijuana indoors requires careful and energy-intensive replication of ideal outdoor conditions, including provision of light, fresh air ventilation, cooling (required due to the energy density of lighting and ventilation) and control of pests

[1] The wholesale price of marijuana is highly uncertain and currently subject to significant market distortion from the illegal nature of the product. The price in a legal-market framework is likely to be lower.

[2] Based on Aluminum futures prices on the London Metals Exchange http://www.lme.com/metals/non-ferrous/aluminium/

and fungal agents. Indoor growing allows high profits from the typically high-grade product that is produced under controlled conditions and is perceived as more secure and stealthy. Indoor cultivation can also achieve multiple harvests per year; growing marijuana with electricity divorces the process from the constraints of seasonal growing and typical harvest cycles.

Figure 1: Indoor Cannabis culture

An extensive peer-reviewed study details the energy consumption of present day indoor production facilities. Lighting levels are elevated 500-times greater than (for example) recommended for reading, while ventilation occurs at 60-times the rate in a modern home. Power densities are about 2000 W/m^2 of growing area (Mills 2012).

A "grow house," or residential building converted to support cannabis cultivation, can contain 50 – 100 kW of installed lighting. Mills estimates that lighting alone has a power density of approximately 400 W/m^2. Lighting often contains a mixture of metal halide (MH) and high-pressure sodium (HPS) lamps, which must be replaced every 3-4 growing cycles.

CO_2 generators, fueled by natural gas or propane, are often used to raise indoor CO_2 levels and boost plant productivity. Concentrations of CO_2 are often raised to four times natural levels, or ~1600 ppm(v). Mills estimates that CO_2 generators are responsible for 2% of the overall carbon footprint of indoor cultivation. However, given the beneficial effect of heightened CO2 concentration on plant yield, this practice may decrease overall environmental impact per unit of product.

(Illegal indoor production often entails off-grid diesel or gasoline fuel generators. Per unit greenhouse gas (GHG) emissions from these generators are often 3-4-times greater than the relatively low-carbon electricity available in the Pacific Northwest or California. Spills of diesel fuel can pollute local water sources and harm aquatic life.(Gurnon 2005) We expect that legal production will avoid nearly all use of off-grid generation.)

The energy costs of indoor cultivation can account for over 1/3 of total costs for representative production systems depending on a range of factors, including the yield of the growing operation and the cost of electricity (growers in private residences pay much higher prices for electricity than those with commercial or even industrial accounts that would be typical in a legal market framework)(Arnold 2013). Arnold also worked with several Northern California dispensaries with indoor production facilities to determine their energy and carbon intensity. She found that each of three dispensaries had an energy intensity of 2,000 kWh / lb. product, and carbon intensity of 1,000 lb. CO_2/ lb. based on the average grid mix for the area. These figures are lower than Mills', and probably represent energy savings from economies of scale in larger production operations.

Other estimates of lighting intensity are in similar range: (Caulkins 2010) estimates lighting intensity of 430 W / m^2, while typical lighting systems [3] are sold at intensity of ~650 W/m^2. As the layout and spacing of each production facility will differ, these figures will vary. Energy required for ventilation varies more widely; Arnold finds that 9-15% is used for ventilation in a large facility, while Mills estimates that 27% of indoor production energy is for ventilation.

Greenhouse

Greenhouse cultivation demands significantly less energy than indoor cultivation practices, though actual energy intensities vary widely. As sunlight is used for plant photosynthesis, most greenhouse energy consumption is due to heating, though a well-designed greenhouse with built-in thermal inertia can keep itself warm most of the time by sunlight alone. Lighting can be augmented with lamps and may be needed to match the yields from fully indoor growing, particularly in the winter months.

Belgian greenhouses have an energy intensity of approximately 1000 MJ/m^2, which Mills notes is about 1% of his estimate for indoor production(De Cock and Van Lierde 1999). Winter heating in a double plastic greenhouse in Serbia requires 9-14 MJ / m^2 (Djevic and Dimitrijevic 2009). The greenhouse was held between 53-59 °F, while daily temperatures in the region average ~30-40 °F in winter months (Unsigned). This is similar to the climate in much of Washington State.

Several factors affect energy consumption in greenhouses, including greenhouse shape, construction material, as well as heating, shading, and lighting

[3] A typical lighting system can use 1000W of lighting power for 16 ft^2 of production area.

practices. It is unclear whether cannabis growers will choose to heat greenhouses during winter months to increase production, but the high value of cannabis will make it more attractive to do so for that crop than it is for other agricultural products.

A greenhouse for horticulture can include a wide range of design and operational features at correspondingly varying capital and operating costs. The enclosure itself can be plastic film, in one or two layers, over a frame, or glass (single or double pane) in a metal or wood construction. Ventilation is usually by gravity where panes in the roof can be opened, and mechanical shades, automated or manual, can provide photoperiod control and limit heat gain. Growing media include soil, media, or hydroponic tanks. Greenhouse operation has benefited from years of experience growing high-value crops like flowers and out-of-season vegetables and the technology should be easily adopted for cannabis.

Outdoor

Field production of psychoactive cannabis is environmentally similar to growing hemp (non-psychoactive cultivars of cannabis) or other nitrogen-hungry field or row crops. Environmental climate effects include small fossil energy inputs per unit of product, mostly diesel fuel for cultivation, indirect energy use for fertilizer production, and fertilizer N_2O release. We have not estimated the full energy implications of field production in the current draft except to note that they are (i) *very* small compared to greenhouse or indoor production (ii) variable in response to agronomic practices like crop rotation and no-till cultivation that have been developed for other crops. In any case, the small acreage required for Washington MJ production would probably otherwise be used for other row or specialty crops with similar energy requirements.

Greenhouse gas and climate

The energy required for indoor growing (and the smaller amounts used for other methods) almost always leads to greenhouse gas (GHG) pollution that increases global warming. We discuss GHG intensity (climate effect) separately from total energy for two reasons: first, because optimizing indoor production can greatly affect the GHG intensity of cannabis cultivation independently of total energy intensity (see below); second, because climate effects are the major unregulated and unpriced environmental consequences of this industry (and many other industries). Growers pay for electricity and all other fuels, and hence see a built-in incentive to reduce their use to an *efficient* level, but using a more- rather than less-GHG-intensive form of energy does not cost the grower any more, and this distortion of efficient incentives–what economists call a *market failure*–is a standard justification for government action. Charging an additional fee for the GHG from electricity consumption for indoor growers (for example) would fix the market failure and provide the correct incentives for innovation. While the climate impact

of cannabis production in Washington will be modest, choices made in Washington now will help shape the development of production technology nationwide and perhaps worldwide, if the movement toward allowing legal production and sale continues.

The Washington electric grid is unusually "low-carbon", mostly hydro-electric and nuclear with only about 17% fossil-fueled, mostly natural gas http://www.eia.gov/electricity/state/Washington/ table 4. The average greenhouse-gas intensity of electricity produced in the state is 135 kg CO_2/MWh. The state is also intertied with the Western USA Grid however, which has a higher carbon intensity. Furthermore, additional loads anywhere on the Western Grid have an impact "on the margin" that is different from the average of the whole grid. The average marginal climate effect of additional electricity demand in the Western Electricity Coordination Council (WECC) region is 486 kg CO_2 / MWh (Siler-Evans, Azevedo et al. 2012), three times the average for the State. The real impact of additional electricity use from cannabis will be close to the marginal factor for WECC, and there is good reason to use marginal costs as indicators of value in cases like this because the consumer's decision to use more electricity rather than less is intrinsically marginal.

Overall, Mills estimates that carbon dioxide emissions are approximately 4600 kg CO_2 / kg indoor cannabis produced but this is based on average national electric GHG-intensity; the figure for Washington production will be much less for the average grid mix (but similar if one takes the marginal WECC emissions factor as discussed above). Using figures derived from (Mills 2012), the Okanogan Cannabis Association estimates that the indoor production of 186 thousand pounds of cannabis, one estimate of state production, would release about 0.4 million metric tons of CO_2(Moberg and Mazzetti 2013), just under one-half of one percent of the total for the state as of 2008.

Indoor production variations could lead to a significant amount of GHG reduction from these average estimates, in particular by concentrating the light periods during the nighttime when demand is low and almost entirely supplied by the low-GHG Northwest baseload plants. This timing also reduces cooling costs from lower outdoor temperatures and the ability to use fresh outside air for cooling.

One set of estimates for the relative contribution of each process to greenhouse gas emissions of indoor cultivation, as well as other process assumptions, is shown in Appendix 1.

Comparison

Using values cited above, we are able to compare high and low estimated values for the energy and GHG intensity of indoor, greenhouse, and outdoor cultivation.

	Energy kWh/kg	**GHG kgCO_2eq/kg**

	Low	High	Low	High
Outdoor	(minimal)	(minimal)	(minimal)	(minimal)
Greenhouse	6	580	1	282
Indoor	4400	6100	590	3000

Table 1 - On-site energy and climate intensity of different cultivation methods per kilogram of product (marijuana).

At $30/tonne CO_2e, a common assumed social cost of GHG emissions, these estimates imply climate damage worth between about 1c and 9c per gram of product for indoor growing, less than 1c for other methods. Even the highest figure represents a modest share (no more than a few percent) of the total cost of production: an issue worth thinking about, but not one large enough to require substantial sacrifices of other goals.

Other Environmental Considerations

Outdoor

Field production of cannabis is environmentally similar to growing hemp or other nitrogen-hungry field or row crops. Environmental effects include small fossil energy inputs per unit of product, mostly diesel fuel for cultivation; fertilizer runoff and N_2O release, water contamination, soil carbon sequestration, and release of toxic chemicals (herbicides, fungicides, and pesticides) are the other important environmental considerations and only fertilizer manufacturing energy, N_2O and soil carbon have important climate implications. We have not estimated the climate effects of field production in the current draft except to note that they are (i) very small compared to greenhouse or indoor production (ii) variable in response to agronomic practices like crop rotation and no-till cultivation that have been developed for other crops.

Fertilizer

Cannabis requires a nitrogen-rich soil environment. Specific application rates, however, are described only in grey literature. Cervantes lists the following application schedule for hydroponic and soil growth, provided by General

Hydroponics (Cervantes 2006). Figures are given in ml. fertilizer / l. water.

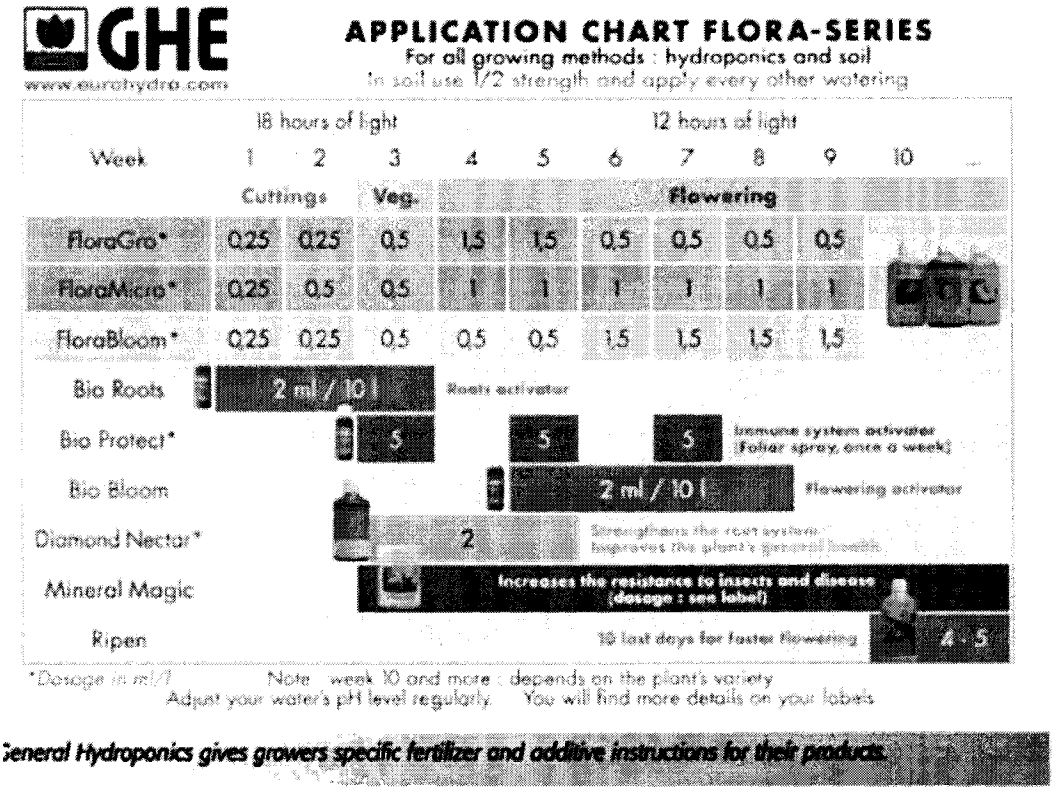


Figure 2: Fertilization recommendations (from (Cervantes 2006)

Soil-grown cannabis requires fewer fertilizer inputs than hydroponic cannabis. Notably, General Hydroponics recommends one-quarter the hydroponic application rate for soil-grown cannabis.

Hemp

Much more information about fertilizer application is available for hemp, an industrial form of cannabis sativa used for industrial and foodstuff products. Hemp has similar nutrient requirements to corn, and requires nitrogen in particular. The British Columbia Ministry of Agriculture and Food (BCMAF) recommends the following maximum application amounts:

Nutrient	Application Amount (kg/ha)
Nitrogen (N)	120
Phosphorous (P)	100
Potassium (K)	160

Table 2: Fertilizer recommendations for hemp (from BCMAF)

Much of this nutrient draw returns to the soil. Consensus among agriculture researchers is that hemp requires a high level of nutrients compared to other crops.

Oregon State University has undertaken an extensive study of the feasibility of industrial hemp production in the Pacific Northwest , including Washington. They note that most research maintains that only soils in high state of fertility produced good crops of hemp. In particular, they recommend adequate application of nitrogen and phosphorus. They provide the following summary of existing literature (Ehrensing 1998):

Country	Year	N (kg/ha)	P_2O_5 (kg/ha)	K_2O (kg/ha)
United States	1952	60	30	40
Spain	1955	60	100	70
Italy	1956	40-60	100	70
Netherlands	1957	100-200		
Rumania	1961	50-70	30-60	
Bulgaria	1964	120	90	60
Netherlands	1964	120	80	160-180
USSR	1965	150	90	120
Netherlands	1966	120	100	100
USSR	1966	120	90	90
Rumania	1966	50	100	
USSR	1968	120	90	90
South Korea	1968	100	60	80
USSR	1969	120	90	90
Italy	1975	75-150		
Denmark	1976	140		
France	1982	100-140	80-120	160-200
Poland	1995	90-120	70-100	150-180
United Kingdom	1995	120	100	160

Table 3: Hemp Fertilization Reports from (Ehrensing 1998)

In estimating the cost of hemp production in the Pacific Northwest, OSU applies a fertilization rate of 600 lb. / acre of 16-16-16 (16% each elemental N, phosphate (P_2O_5), and potash (K_2O)) fertilizer.

The Reason Foundation similarly reports application rates in Canada of 55-80 lb. / acre and 30-40 lb. / acre phosphate (Smith-Heister 2008).

Water

Indoor

Indoor cultivation of cannabis is water-intensive, particularly when it is hydroponic. Mills estimates that one cultivation room (22 m^2) requires 151 L / day (Mills 2012). This is equivalent to 2.5 m of water per year (98 in. / yr.) of application. This level of water application is much higher than traditional soil-grown water application.

Hydroponic pollution is also a concern for indoor cultivation. In addition to higher water demand, hydroponic systems produce more nutrient pollution than other growing methods. In Northern California, water used for indoor cultivation contributes to pollution in local streams. Water is often illegally diverted through PVC pipes to nearby grow operations, with negative effect on pH, stream flow, water temperature, and nutrient content (Shafer 2012).

Hop cultivation

To understand the water consumption of outdoor cannabis cultivation, we will infer from two other crop: hops and hemp. Hemp is taxonomically the same species as psychoactive cannabis; hops is a different species of the family *Cannabinaceae.*

Research at Washington State University indicates that 300 -450 gallons of water are needed to produce a pound of hops in the Yakima Valley of Washington. In 1992, all hop acreage in Washington was irrigated (Zepp and Smith 1995). Hops in the Yakima Valley generally consume about 28 inches of water per year, though annual application can exceed 50-60 inches (Extension). 75-80% of total annual water use occurs after mid-June, particularly in late July and early August, with maximum daily water uses of about .5 in / day. These numbers should only serve as guidance: soil type contributes to water holding capacity, while irrigation methods determine frequency and volume.

Hemp cultivation

BCMAF estimates that hemp grown in British Columbia requires 12-15 in. (30-40 cm) of water per growing season or rainfall equivalent (Food 1999). Hemp cultivation in the UK requires 20cm of precipitation per growing season (Cherrett, Barrett et al. 2005).

OSU discusses the water and irrigation requirements of hemp at length, finding that "hemp will almost certainly require irrigation to reliably maximize productivity in the region. The requirement for supplemental irrigation will place

hemp in direct competition with the highest value crops in the PNW [Pacific Northwest], limiting available acreage." They also note that hemp yield is strongly dependent on the amount of rainfall during June and July (Ehrensing 1998).

As large-scale hemp production has generally been centered in areas with significant rainfall, very little information is available about hemp irrigation. While 33% of cropland in the PNW is irrigated, only 20.5% of cropland in Washington was irrigated in 1992. The PNW faces water deficits, and new irrigation is unlikely.

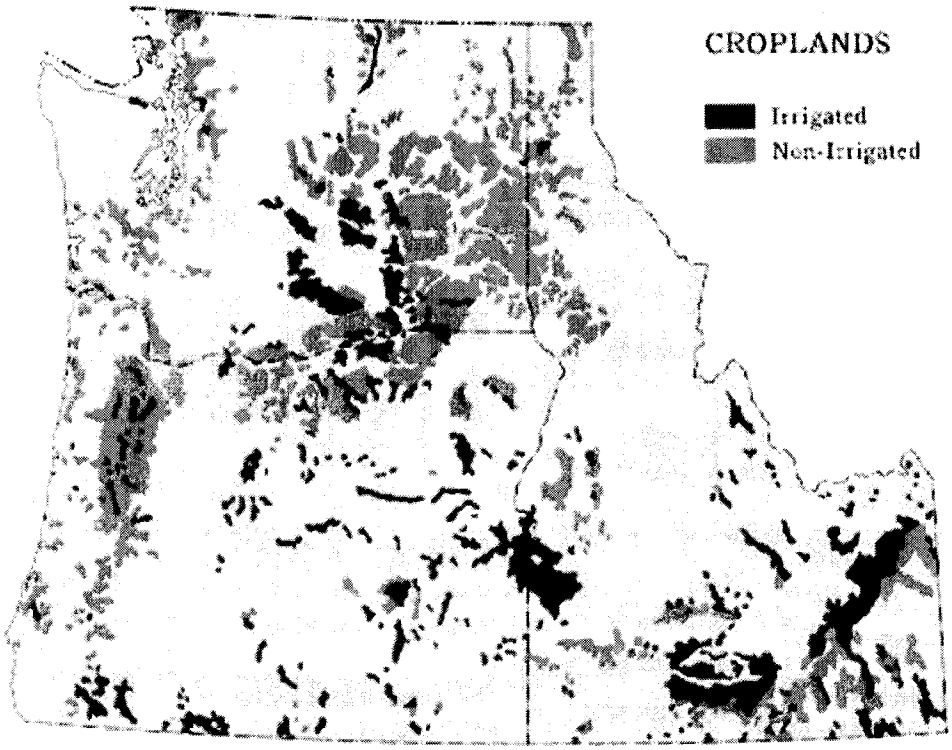


Figure 3: Distribution of irrigated and non-irrigated cropland in the PNW from (Jackson and Kimmerling, 1993)

Table 4. Cropland area in the Pacific Northwest in acres (1992 Census of Agriculture).

	Irrigated	Non-Irrigated	Total	% Irrigated
Idaho	3,260,006	3,041,856	6,301,862	51.7
Oregon	1,622,235	3,415,529	5,037,764	32.2
Washington	1,641,437	6,357,982	7,999,419	20.5
Total PNW	6,523,678	12,815,367	19,339,045	33.7

OSU believes that hemp cultivation will probably occur west of the Cascades because of water availability:

> With early spring planting, it may be possible to grow hemp using available soil moisture and rainfall in some areas west of the Cascades, much like spring cereal grains. Risks associated with such production will be high and yields may be quite variable from season to season ... Reliable irrigation can, however, reduce weather risks associated with rainfed production. Irrigation is not only an additional economic cost of production, but is also an environmental concern, especially considering recent controversies surrounding agricultural water use and increasing demand for in-stream water rights in the PNW (Ehrensing 1998).

Precipitation in Washington is very limited east of the Cascade Mountains. However, the state's extensive infrastructure of dams and irrigation in that region probably affords ample water for the small acreage that may be devoted to marijuana, and the climate is more suitable during the summer.

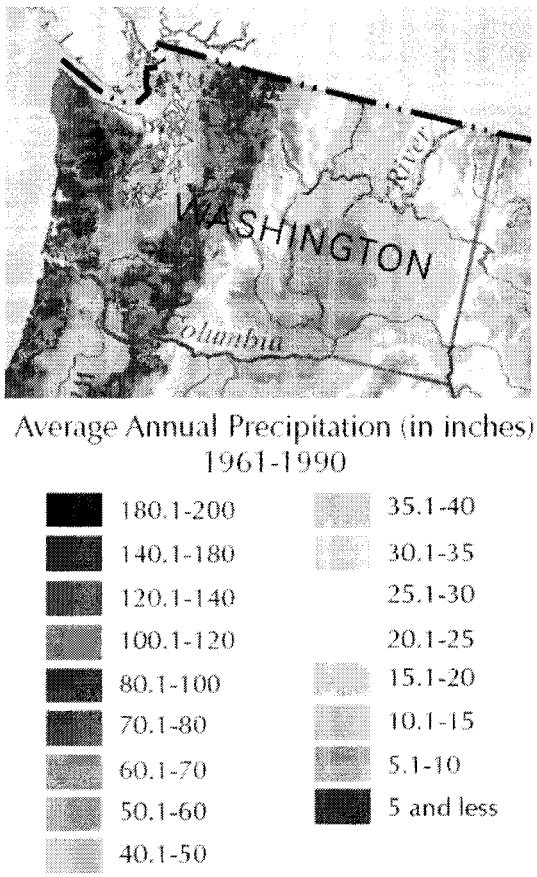


Figure 4: Rainfall in Washington

Pesticides/herbicides/fungicides

Under draft LCB regulation, all usable marijuana for sale in the State of Washington must carry a warning that discloses all pesticides, herbicides, and fungicides or other compounds used for pest control or plant disease in production or processing (2013). Current indoor cultivation often employs pesticides and herbicides (Cervantes 2006). control of chemical residues in cannabis products is considered in another report in this project; the environmental issues are only application drift and water (runoff and groundwater) pollution by agricultural chemicals (but see below regarding illegal vs. legal production general environmental issues).

Hemp cultivation

No pesticides or herbicides are registered for hemp or cannabis. BCMAF notes that hemp is freer of pests than other crops, while weeds can be reduced to virtually zero under a dense hemp canopy (Food 1999). OSU concurs: they find that herbicides and pesticides are not commonly used in hemp production, and significant crop losses from pests are not common. Because of these qualities, OSU believes that

hemp can be used for weed suppression, noting "Weed suppression with minimal pesticide use is potentially one of the greatest agronomic and environmental benefits of growing hemp in rotation with other crops." Birds, however, feed voraciously on cannabis seeds and their feeding can lead to substantial crop losses (Ehrensing 1998).

OSU cautions that the introduction of new crops such as hemp to the PNW region can result in unforeseen pest problems: "High-density planting, increased fertilizer use, and irrigation have often increased incidence of pest problems in other crops, and such problems should be anticipated with intensive hemp production."

The following pests are commonly associated with hemp:

Pseudomonas syringae pv. cannabina (bacteriosis of hemp)

Xanthomonas campestris pv. cannabis (leaf spot of hemp)

Fusarium oxysporum f.sp. cannabis

Pseudoperonospora cannabina (downy mildew of hemp)

Orobanche spp. (broomrape) (Cherrett, Barrett et al. 2005)

Other Toxics

Heavy metal and toxins from lighting

Lighting materials used in indoor cannabis cultivation have environmental risks if not properly managed for disposal. High-intensity discharge (HID) bulbs are not recyclable; each bulb contains approximately 30 mg of mercury and other toxins. Mercury is a neurotoxin, and is recognized as extremely toxic, particularly in gaseous form. The Okanogan Cannabis Association estimates that indoor cultivation of cannabis could produce 46,000 HID bulbs each year in Washington (Moberg and Mazzetti 2013).

Using productivity assumptions in Mills, we estimate that there is the potential for 30 mg of mercury pollution per kg of cannabis product if proper disposal is not practiced. However, other lighting applications generate waste lamps that need management outside the standard municipal waste stream and this recycling/disposal system could serve as well for cannabis lighting waste.

Legal vs. illegal cultivation

Rapid expansion of illegal outdoor marijuana cultivation in northern California, including cultivation on public land, has become recognized as a source of serious environmental damage, from wildlife poisoned by pesticides to overdrafted and polluted rivers to deforestation and erosion (Shafer 2012; Barringer 2013). As mentioned previously, spills of diesel fuel often pollute local water sources. The

North Coast Journal describes the diesel generators often employed for off-grid electricity production in Humboldt County:

> The diesel generators supplying power for the 1,000-watt grow lights can be as big as a small pickup truck. They are sometimes buried underground, which can be a fire hazard, or rigged with plastic water tubing instead of proper fuel lines. They are often placed in dubious locations, such as right beside creek beds -- greatly increasing the potential for contaminated water -- because the depth and the surrounding trees help to muffle the machines' drone. Some growers even use water tanks to store the diesel fuel, officials said.(Gurnon 2005)

An important environmental advantage of legal, licensed, cannabis production will be its displacement of environmentally damaging practices by criminals and unregulated parties. We are not able to quantify these benefits but believe them to be significant.

Options for Environmental Protection

This section highlights management practices that can reduce the environmental footprint of cannabis production.

Energy-Efficiency Measures

Outdoor cultivation of cannabis does not raise important energy issues different from other crops. Conventional good agronomic practice such as low-till/no-till, erosion and runoff control, careful control of nitrogen application and timing, integrated pest management, and the like all apply and expertise in these practices is available from county agents and extension services. It is unlikely that the LCB will want to develop this kind of expertise or micromanage outdoor growing for environmental effects.

Excellent guides exist for energy efficiency measures in greenhouses, for example (Bartok 2005). In particular, greenhouse design should consider the effects of glazing materials on heat loss and light transmission, ways to reduce infiltration and nighttime heating losses, greenhouse heating units, the effect of heat distribution on heating costs, ways to maximize space utilization, using efficient circulation and ventilation fans, and how supplemental lighting can reduce energy requirements (Sanford 2010). Energy consumption involves tradeoffs with plant yield and other agronomic needs. Given the high value of cannabis, growers face a strong incentive to use more energy to increase yields than growers of other products.

Efficient greenhouse design is strongly dependent on location and climate, but several themes for good design emerge. Sanford 2010 recommends high

efficiency condensing heaters, effective space utilization, basket fans for air circulation, control systems, and energy audits to reduce consumption. In particular, curtain systems can dramatically reduce energy costs. Curtain systems also allow growers to tightly control the amount of light their plants receive, enabling photodeprivation and other advanced growing techniques. (Sanford 2010; Sanford 2010)

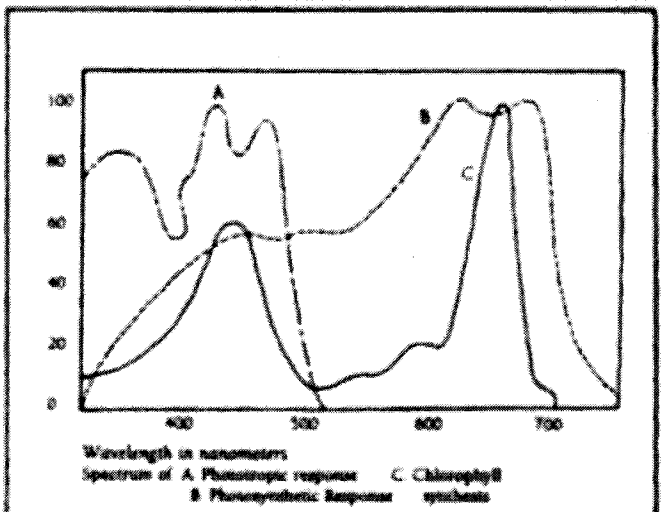
Indoor operations occur in buildings covered by existing Washington building regulations and conventional energy conservation practices such as insulation. The most important opportunities for environmental benefit lie in more efficient lighting equipment and timing to avoid peak use periods.

LEDs for indoor cultivation

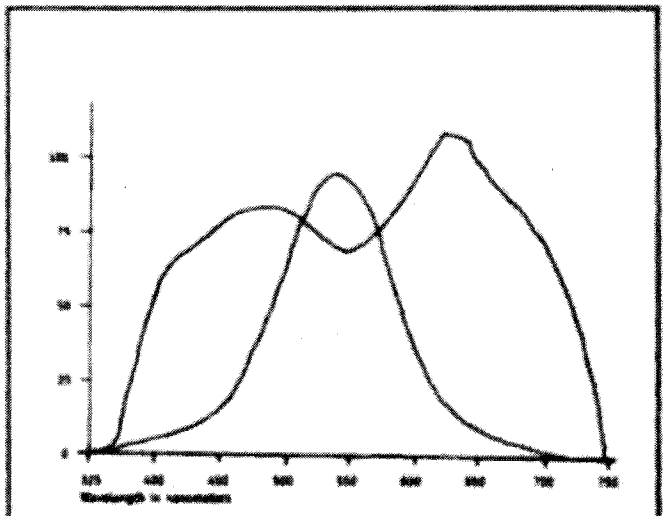
Light-emitting diodes (LEDs) have several advantages over high intensity discharge (HID) or high pressure sodium (HPS) lighting: lifetimes in excess of 100,000h, small size, specific wavelength, adjustable light intensity and quality, and high conversion efficiency (with low thermal losses) (Yeh and Chung 2009).

Plant growth depends specifically on the amount of photosynthetically active radiation (PAR) it receives. Plant varieties have specific PAR spectra, which differ from the sensitivity of the human eye. Chlorophyll molecules absorb red and blue wavelengths most efficiently. Green light, a major constituent of white light and the peak of the solar spectrum and human vision, is not as useful for plant growth. Because plants have different spectral preferences than people, the general lighting that is optimized for lumen output may not be ideal for plant growth. Agricultural lighting is a sub-field of the lighting industry and uses specially tuned light sources to match the PAR spectrum.

In general, the more energy that can be directed into wavelengths plants can use, the more product per kWh will be produced (and the lower the resulting GHG intensity of the product), and LEDs offer not only high overall light output-per-watt efficiency (horticultural LED arrays can provide three times more light output per watt of input power on an area-equivalent basis than HID lamps (Morrow 2008)) but also the potential to "tune" the emitted spectrum to plant needs.



This chart shows the exact level that A. Phototropic response, B. Photosynthetic response and C. Chlorophyll synthesis take place.



The single humped line in the center of the graph represents the visible light spectrum seen by the human eye. The dual humped line represents the spectrum cannabis needs to grow.

Fig. 5: The PAR for cannabis from (Cervantes 2006)

Unfortunately, commercially available LEDs are not yet optimized for plant growth. Yeh 2009, however, argues that LEDs are the first light source to provide true spectral control, allowing wavelengths to match to plant photoreceptors to optimize production as well as to influence plant morphology and composition. In addition, LEDs are easily integrated into digital control systems and can be dimmed (Yeh and Chung 2009). This adaptability, along with lower waste heat production, means that LEDs have the potential for very large energy savings in comparison with existing lighting technologies.

While luminous efficacy is an imperfect measure of a lamp's ability to deliver PAR due to spectral mismatch, the following values are representative of overall efficiency of light production:

Lighting Type	Overall luminous efficacy (lm / W)
100 W tungsten incandescent (120V)	17.5
LED, theoretical limit	~400
Available 8.7 W LED (120V)	69-93
Metal halide lamp	65-115
High pressure sodium	85-150

Table 5: Lighting source comparison from (Luminous efficicacy: Retrieved May 29, 2013, from http://en.wikipedia.org/wiki/Luminous_efficacy#Lighting_efficiency.)

Substitution and Complementarity

Cannabis consumption also has indirect impacts on consumption of other goods; it is presumably a substitute for such synthetic cannabinoids as Spice and K2, and a complement to Doritos and unbaked chocolate-chip cookie dough. Whether it complements or substitutes for the consumption of various other psychoactives remains unknown, and the answer need not be the same for all drugs or all user types. (See Boyum *et al.* 2011 and references there.) If it were to turn out that cannabis substituted directly for alcohol (a point on which the research literature is divided and inconclusive) that substitute would create some offsetting environmental benefits/ Beer brewing also has energy demands (the energy requirements for one marijuana "joint" are approximately equal to those for 18 pints of beer (Mills 2012)). This means that any environmental impacts from increased marijuana consumption in a legal market framework could be partially mitigated from substitution away from alcohol. The benefits of substituting cannabis for methamphetamine would be even greater. But since even the signs of

the relevant cross-price elasticities are unknown, this analysis does not include this effect.

Recommendations

The following recommendations describe regulations, enforcement mechanisms, collaborations, and tax schemes that promote environmentally responsible cultivation of cannabis. LCB should consider feasibility, enforceability, and potential for market transformation when adopting a portfolio of environmental policies.

LCB's tools are primarily regulatory. Regulatory practice can be categorized into four distinctive approaches: process-specifying, product-specifying, outcome-specifying, and incentive-based. *Product* regulation allows and forbids products on an all-or-nothing basis; an example is the prohibition of wooden cutting boards in restaurants. *Process* regulation requires specific protocols, for example that restaurants wash dishes in a dishwasher using water above a certain temperature. *Outcome* regulation specifies properties of a product or process without requiring that they be achieved in any particular way; an outcome-based regulation for food could be a maximum allowed bacteria count for cutting boards, that the operator can meet by disinfectants, careful sanitation and management of contamination sources, or any other way. Finally, *incentive-based* regulation gives the producer consequential encouragement to provide more of a desired outcome but without (in principle) a minimum level of achievement. An example of this is the A,B,C hygiene ratings health departments award to restaurants in the expectation that an A rating will increase sales enough to make it worth it for most restaurants to achieve it, even though some restaurants' clientele may prefer the combination of price and risk resulting represented by a C score.

In general, policy analysts favor these practices in the reverse of the foregoing order, with incentive methods most preferred. The advantages of the later-listed approaches is that they preserve incentives for innovation while focusing on the specific types of benefit the regulatory program is intended to obtain.

Despite the regulatory orientation of the LCB's marijuana program as currently conceived, we also include recommendations for non-coercive policies (advice, consulting, and research) that can improve the industry's environmental practice. Some of these may benefit from collaboration with other state agencies and non-profits.

Legal, licensed outdoor growing has the lowest environmental impact.

The LCB should consider allowing outdoor growing as either promises significant environmental advantages and lower production costs than indoor cultivation. Process regulations for security might lead to better overall results than outlawing field growing altogether.

Greenhouse cultivation promotes significant environmental protection relative to indoor growing

Greenhouse cultivation of cannabis entails lower energy consumption, GHG production, water consumption, wastewater production, fertilizer application, and toxic risks than indoor cultivation. LCB should promote greenhouse cultivation of cannabis, including cultivation in eastern Washington where the climate (hours of sunshine)) is more favorable. Allowing production in standard greenhouses, rather than requiring new construction of high-security greenhouses, would encourage substitution away from environmentally problematic indoor growing.

Recognize the high GHG intensity of indoor growing with a differential tax

Energy efficiency and GHG reduction for indoor growing, where it matters most, can be pursued by outcome regulations such as (for example)licensing only operations meeting maximum electric consumption per growing area standards. Growers already have economic incentives for efficient use of electricity, but a main 'missing piece' of this framework regards GHG emissions, which as we have seen can vary significantly across production practices, are especially high for indoor operations, and are not reflected in electricity prices. A simple recognition of the distinctive climate effects of indoor growing would be to increase the producer tax on indoor marijuana by an amount that reflected (approximately) its respective carbon footprint. At $30/tonne of CO_2-a typical value in carbon markets-and assuming average Washington electricity GHG intensity and our "high" value for electric use per unit of product, this would be about 9c per gram of marijuana based on the marginal emission factor of Washington electricity. This amount would not ruin the competitiveness of indoor production but would provide a gentle incentive and have considerable symbolic value. The current cost of commercial electricity for cannabis production is about $400 per kilogram of finished product. This additional climate fee would amount to approximately a 20% surcharge on electricity use. The status quo for indoor growing is on residential electricity accounts, with average rates that are 9% higher than the average commercial rate in Washington. Climate fees would essentially preserve (or slightly increase) the status quo incentives for energy efficiency.

Collaborate with the Washington State Energy Office, Utilities and Transportation Commission, and Washington State University, in the development and diffusion of lower-energy production practices.

Two technology areas for energy reduction and climate protection are especially promising: LED lighting for horticultural application, and energy efficiency measures for greenhouse heating. The Washington State Energy Office, located in the Department of Commerce, runs the State Energy Program that provides funding for energy technologies.

Develop LEDs for cannabis applications

LED developed for horticultural applications have the potential to significantly reduce lighting energy for both indoor and greenhouse applications. However, commercial development to date has focused on producing white light, rather than red/blue ("pink") LED arrays optimized for horticulture. LCB, the state universities' engineering and agriculture departments, and the Washington Department of Commerce could collaborate to advance commercialization of these technologies, serving as a critical link among LED consumers, academic researchers, and manufacturers.

Develop region-specific best practices for greenhouse energy efficiency

Cost-effective energy efficiency measures are driven in large part by regional climate. While University extension programs in Wisconsin and Connecticut have developed best practices for greenhouse efficiency, to our knowledge no similar effort has been performed in the Pacific Northwest. LCB should work with the State Energy Office or Washington State University to develop best practices suited to greenhouse cultivation of cannabis. Such a study should employ publicly available energy model software, such as EnergyPlus, to accurately model the effect of building material, glazing, orientation, layout, heating systems, and shading on energy consumption in targeted cultivation areas. Attention should also be given to calculating a benefit-cost (B/C) ratio for efficiency measures. LCB should also seek industry input in developing these best practices.

Encourage time-of-use pricing with lower rates for night-time electric use

Off-peak electric usage in a system like Washington's, where baseload power is very low-carbon, has many benefits including reduced GHG emissions relative to daytime use. Smart meters and nighttime lighting in indoor growing facilities can encourage growers to move a significant amount of the electric usage to this environmentally favorable period.

Collaborate with Washington State University and other stakeholders to continue research on environmental impacts

Quantification of environmental impact in this report has relied on grey literature, craft-skill descriptions, and a small but growing set of academic and consulting reports. As the cannabis industry matures in Washington, academic and industry agricultural researchers should continue to measure the environmental impact of cannabis production methods. This research can be used to refine future regulation and drive environmentally friendly production methods.

Consider labeling of "climate smart" or "environmentally friendly" cannabis for public sale in Washington

Draft LCB regulations entail labeling regulations for cannabis sold publicly. LCB should consider branding cannabis that excels on environmental grounds, similar to the ENERGY STAR program administered for the U.S. Environmental Protection Agency for household appliances (2013). Such labeling programs, which affix a readily identifiable label among the most efficient products, can drive environmentally responsible purchasing and encourage a "race to the top" among producers. LCB could allow labeling for on energy/GHG consumption ("climate smart"), pesticide application ("environmentally friendly"), or a hybrid indicator.

Production enforcement mechanisms can promote environmental protection

Many of the most environmentally harmful practices in cannabis cultivation arise from a lack of information among regulators and the secret nature of cultivation. These include water diversion, water disposal, pesticide application, and electricity generation from on-site diesel generation. LCB should take advantage of the permitting process and information collection procedures to mitigate environmental damage.

Inspections of permitted facilities can ensure compliance with environmental regulation. In particular, LCB or other agencies should ensure that no illegal water diversion takes place, that only permitted pesticides, herbicides, or fungicides are being used for cultivation, and that diesel generation is properly permitted or installed. Inspections are supplemental to other environmental process regulation, and may overlap with other State agency jurisdiction.

While we cannot review the extensive literature on regulatory practice here, it's worth noting that "enforcement" regimes can vary widely in the underlying philosophy of their implementation, from strict defect-finding and punishment to a more complex regime in which inspectors see their job as not only police officers but 'production engineering consultants' providing information on best practices and opportunities to improve performance within the legal range.

Process Regulations can promote environmental protection

In addition to or in place of the tax differentials described above, a mechanism widely regarded as the most efficient generic approach to environmental regulation, LCB can use its permitting authority to enforce process regulations for cannabis cultivation. In particular, LCB should consider banning practices that promote toxic environmental releases, such as diesel generation, improper lighting disposal, and improper water disposal. Such regulations may overlap with or be redundant to other State or Federal regulations.

LCB should require all electricity be grid-connected

As diesel spills relating to on-site electricity generation can pollute waterways, LCB can require that all production facilities draw their electricity from the grid (with perhaps an exception for off-the-grid solar and other small-scale renewable sources). This would remove the incentive for producers to employ on-site fossil-fuel generation. It would also subject producers to Washington's increasing block rate structure electricity tariff, which increased the economic incentive to employ energy efficiency technology.

LCB can establish lighting disposal regulations

Given the high potential for mercury release from HID bulbs, LCB should ensure proper disposal of bulbs used for cannabis production. As HID bulbs are not recyclable, LCB could mandate a separate lighting disposal stream to ensure that bulbs do not cause air or water contamination.

Appendix 1: Figures from Mills 2012

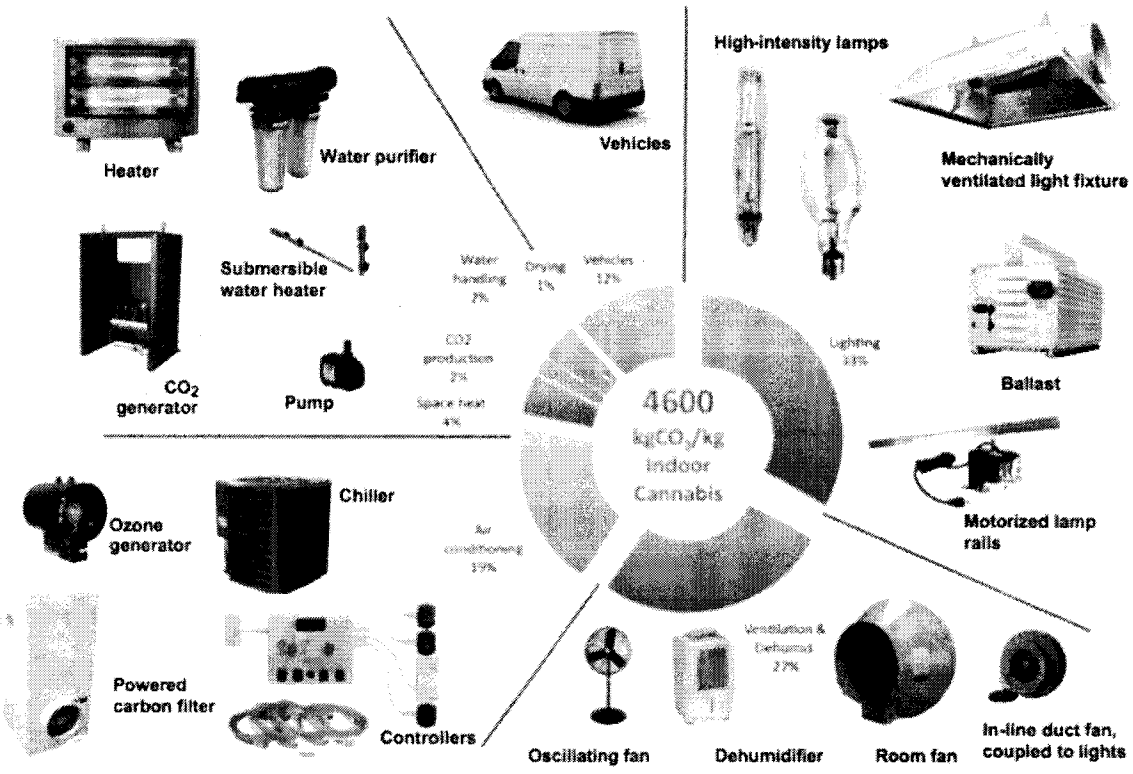


Fig. A1 - Relative contribution of energy-consuming appliances to overall CO_2 emissions for indoor production of cannabis.

Table A1
Configuration, environmental conditions, set-points.

Production parameters		
Growing module	1.5	m^2 (excl. walking area)
Number of modules in a room	10	
Area of room	22	m^2
Cycle duration	78	days
Production continuous throughout the year	4.7	cycles
Illumination	Leaf phase	Flowering phase
Illuminance	25 klux	100 klux
Lamp type	Metal halide	High-pressure sodium
Watts/lamp	600	1000
Ballast losses (mix of magnetic & digital)	13%	0.13
Lamps per growing module	1	1
Hours/day	18	12
Days/cycle	18	60
Daylighting	None	none
Ventilation		
Ducted luminaires with "sealed" lighting compartment	150	CFM/1000 W of light (free flow)
Room ventilation (supply and exhaust fans)	30	ACH
Filtration	Charcoal filters on exhaust; HEPA on supply	
Oscilating fans: per module, while lights on	1	
Water		
Application	151	liters/room-day
Heating	Electric submersible heaters	
Space conditioning		
Indoor setpoint — day	28	C
Indoor setpoint — night	20	C
AC efficiency	10	SEER
Dehumidification	7x24	hours
CO_2 production — target concentration (mostly natural gas combustion in space)	1500	ppm
Electric space heating	When lights off to maintain indoor setpoint	
Target indoor humidity conditions	40–50%	
Fraction of lighting system heat production removed by luminaire ventilation	30%	
Ballast location	Inside conditioned space	
Drying		
Space conditioning, oscillating fans, maintaining 50% RH, 70–80F	7	Days
Electricity supply		
grid	85%	
grid-independent generation (mix of diesel, propane, and gasoline)	15%	

Fig. A2 - Assumptions and inputs for process analysis of indoor cultivation.

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Exhibit 4

Water Boards

Fact Sheet

Marijuana Cultivation on the North Coast Threatens Water Quality and Wildlife

Cultivation of marijuana in the North Coast Region has grown exponentially in recent years, both in the number of grows and the size of grow operations. The growing operations are appearing on both private and public land.

The North Coast Regional Water Quality Control Board (Regional Water Board) is not interested in entering the debate over the legality of growing marijuana in California, other than to note that any growing operation on public land is illegal regardless of the crop. The Regional Water Board has jurisdiction over discharges of waste that could affect waters of the State, regardless of what activity is generating the waste.

The Regional Water Board has serious concerns about the water quality impacts from the dramatic increase in growing activity on both public and private land.

The Problem

Growers have engaged in a variety of activities that can threaten or damage riparian and aquatic habitat, including:

- grading, terracing, dam, and road construction without permits, leading to the filling of streams through erosion and sediment deposition;
- deforestation and habitat fragmentation;
- illegal use of rodenticides, fungicides, herbicides and insecticides;
- use of soil amendments and fertilizers in situations where run off to surface waters may occur;
- discarding of trash and haphazard management of human waste;
- substandard storage of hazardous materials such as diesel and gasoline; and
- unauthorized diversion of water from streams.

These activities impair beneficial uses of the water, from municipal drinking water to swimming, and from agriculture to preserving habitat for endangered fish and wildlife.

Isn't Marijuana Cultivation a Big Economic Boost to the Region?

That may be true, but growers are required to follow the same rules as every other industry. Water quality, fish and wildlife are public trust assets that shouldn't be sacrificed for private economic gain.

How Big is The Problem?

No one knows the true scope of the increased growing activity and the related quantity of water being diverted from local streams, because most growers do not register or apply for permits from the various agencies involved in protecting water quality, existing water rights and wildlife.

A Department of Fish and Wildlife study of two small watersheds in Humboldt County using aerial imagery indicates that the number of acres devoted to marijuana growing almost doubled from 2009 to 2012, with an estimated 550 individual growing operations and 19,000 plants in each watershed.

What's Being Done About It?

There are existing appropriate permits that should be obtained to make sure that site development activities are done in a manner that is consistent with state and federal law. The attached information sheet identifies water quality concerns and necessary permits and explains how to comply with their requirements for site development and reporting diversions of water. These permits and requirements apply to any site preparation work, regardless of crop.

In addition, the Regional Water Board staff is developing a category for medicinal marijuana as part of its Agricultural Lands Discharge Program that will provide authorization for discharges of waste if water quality protection requirements are met. This will provide permit coverage for growing operations on private lands. Discharges of waste on public lands are not authorized. Under the USFS Waiver (*Waiver of Waste Discharge Requirements for Nonpoint Source Discharges Related to Certain Federal Land Management Activities on National Forest System Lands in the North Coast Region*, Order No. R1-2010-0029), nonpoint source discharges of waste to waters of the state from activities associated with timber harvesting, national forest system roads, grazing, recreation, vegetation manipulation, restoration, and fire suppression are authorized subject to the requirements and conditions of the Waiver. Discharges of waste from site development and growing activities on USFS land are not authorized and are subject to immediate enforcement actions under the California Water Code.

The State and Regional Board are working to educate the public and growers about proper permitting and growing practices. Additionally, local, state and federal agencies, including the State and Regional Board are working together in task forces to find illegal growing operations and enforce applicable laws.

What Can the Public Do to Help?

The public can help in two ways: making friends and neighbors aware of the issues; and reporting water quality violations they see to the North Coast Regional Water Quality Control Board.
To file an environmental complaint, contact Stormer Feiler at the North Coast Regional Water Quality Control Board (707) 543-7128 or email stormer.feiler@waterboards.ca.gov, or
Submit an environmental complaint to Cal/EPA via the following web link:
http://www.dtsc.ca.gov/database/CalEPA_Complaint/index.cfm
(This site can also be used for water right complaints)

Following is an informational sheet on how to comply with necessary permitting requirements:

Water Boards

Fact Sheet

To: Interested parties and agencies

SUBJECT: 215 Grow-Related Activities Which May Need a Regional Water Board Permit or Special Planning for Water Quality Protection

Agricultural activities, including marijuana production, can harm our State's waters if they are not carried out properly. If you are planning to develop land to grow marijuana in compliance with State law and local ordinances, there are several agencies you should contact BEFORE you get started. The North Coast Regional Water Quality Control Board (Regional Water Board) is one of the agencies that may need to review and permit the activities associated with your project. The State Water Resources Control Board's Division of Water Rights is another. Before you start developing your property to conduct your growing project, here is a series of questions you should ask yourself to see whether your activities may need a permit from the Regional Water Board.

1) Will I be doing any work that involves digging or heavy equipment work in a watercourse/wetland or in a location where rain could wash dirt into a year-round or seasonal creek, river, wetland, or wet feature?
2) Will I be placing any type of material or structure in a stream, either year-round or seasonal (e.g., stream crossing, culvert, water intake, dam, etc.)?
3) Will I be diverting water from a stream?
4) Will I be building any roads, landings, terraces or other features that involve placement of earthen fill material on my land?
5) Will I be grading, excavating, or otherwise moving earth on my property?
6) Will I be using and/or storing pesticides, herbicides, fertilizers, fuel, or other chemicals on my property?
7) Will I be generating and/or storing solid waste (e.g., amendment bags, boxes, containers, dead plant material, waste soil, etc.) on my property?

If you have answered yes to questions 1, 2, or 3, you will probably need a permit from the State or Regional Water Board, and we suggest that you contact us at (707) 576-2220 to get further information about how to apply for the appropriate permits. Note that any person who discharges waste to waters of the State without a permit may be subject to enforcement and possible penalties. Information about California water rights is available on the State Water Resources Control Board's Division of Water Rights website at: http://www.waterboards.ca.gov/waterrights/. Any diversion and use of water without a water right, and a failure to report the diversion and use of water are also subject to enforcement and penalties.

If you have answered yes to questions 4 or 5, you may need a permit from the Water Boards, and your project may harm water quality if not constructed carefully, subjecting you to enforcement and possible penalties. It would be advisable to hire a qualified professional with experience in erosion control to help you design and construct your project in a way that will avoid allowing dirt to get into waterways. We recommend that you contact the Regional Water Board to review your project and identify whether your project will need a water quality permit.

Finally, a yes answer to question 6 or 7 will not require that you get a permit from the Water Board if you manage these materials responsibly and consistent with the manufacturer's specifications. We recommend that as you design your project, you consider and identify suitable location(s) on your property, possibly within a container or structure, where you can safely contain such materials away from surface and/or ground waters in a manner that eliminates the possibility of discharge.

Dumping or allowing dirt or other wastes to enter streams or groundwater is illegal, as is discharging any of the materials noted above to streams or groundwater. If you have any questions or would like assistance in reviewing your compliance with water quality laws and requirements and/or need for permits, please contact the Regional Water Board at (707) 576-2220. Information about the Regional Water Board can be found at our website: http://www.waterboards.ca.gov/northcoast/.

Updated 8.5.13

Dear Neal Coonerty,

Copy To Each Supervisor

I am writing to address the upcoming proposal regarding Medical Marijuana. While I agree that there is a need for more regulation - and I applaud you for your current efforts - I believe that the individuals who have the power to put a new ordinance in place (i.e. you) need to be educated by the community it will affect most first. In this light I want to recommend that you work hand-in-hand with the Association for Standardized Cannabis a group of educated individuals within the medical marijuana community. I ask each of you to proceed with what I have suggested in mind, and hope that you take the time to educate yourselves and consider the impact of your [redacted]. conclusion. Thank you for your time and consideration.

Sincerely,

An Anonymous Community 46 Member

Dear Santa Cruz County Board of Supervisors,

I am writing to address the upcoming vote on October 22nd about the proposed medical marijuana regulations. I commend the Board for attempting to better regulate the cultivation and distribution of medical marijuana, however I feel compelled to point out that **the proposed changes would be detrimental to Santa Cruz county**. I am aware that there was a town meeting to voice concerns; unfortunately I did not hear that the issue was being discussed until after the meeting when I read about it in the Santa Cruz Sentinel. Out of respect for your time, I will attempt to be concise and take each of the proposed aspects of legislation individually. The points I am addressing will only be the ones mentioned in the SC Sentinel, as I have not been able to locate a draft of the proposed changes.

Dispensaries:
In my opinion, the increased restrictions on dispensaries are the least harmful of the three main areas being tackled. After visiting areas such as San Jose and Los Angeles where marijuana dispensaries are on every street, regulation of the opening of future storefronts is prudent, to a degree. I appreciate the use of increased background checks and bans from children-friendly areas (e.g. schools, playgrounds etc). However, I think it is imperative that the few locations that already are serving the county's medical patients be allowed to maintain their services. Furthermore, I believe any legislation should provide a clearly delineated process for future dispensaries to apply for and receive permits. As is the American way, the opening of new businesses will ensure that competition and innovation are maintained: two important elements for the benefit of patients. There should also be increased attention given to future dispensaries meeting unfulfilled needs.

Outdoor Grows
As a lifelong nature enthusiast and environmental activist, I see great need for regulating the outdoor cultivation of marijuana. Requiring growers to comply with environmental laws is common-sense and particularly in line with the spirit of Santa Cruz County. My concerns here are the seemingly arbitrary limitation on size as well as the failure to have a cheap and realistic means of enforcement.

> While 1,000 sq. feet sounds like an adequate amount of space to produce a years worth of medicine, this fails to take into account the concept of medical marijuana collectives. One of the wonderful aspects about Santa Cruz County medical marijuana regulations is the ability for patients to band together in an effort to minimize cost and allow individuals who are unable (either based on time, physical ability or living situation) to produce their own medicine. As far as I know, the current legislation would treat one patient with a 1,000 sq. ft. canopy and a 10-patient collective with 1,000 sq. ft. the same. Any future regulations on outdoor grows must make an effort to define space based on collective size.

Furthermore, the cost of enforcement comes into play here. Clearly, regulation of such a measure should be self-sustaining and not hinder law enforcement efforts in other areas. I am concerned that the proposed regulations would be extremely costly or extremely ineffective. To devote millions of dollars of law enforcement time, equipment and funds to regulating an individual's legal cultivation of marijuana on their own land when we have violent gangs and dangerous amounts of guns, heroin and meth on the streets seems ludicrous. If regulation were to be enforced retrospectively (complaint-based as they currently are) as opposed to the aforementioned costly inspection of the entire county, than efforts to protect our environment would fall short. There would be little incentive for outdoor growers to follow environmental restrictions but instead to devote efforts to not raising alarm with the neighbors.

Third, proposed limitations on indoor grows are extremely inadequate.

As previously mentioned, the regulations would prevent the formation of collectives, which for many are the only feasible way in which patients can produce and receive high-quality indoor medicine. With the cost and labor of producing indoor cannabis being so high, many patients form collectives so as to have one larger, cheaper, and easier to maintain indoor cultivation site. The arbitrary limit on size would eliminate these, thus forcing many patients to turn to the dispensaries for their medical needs or increasing the number of grows by spreading them throughout numerous collective members houses, thus exacerbating the problem.

In addition, proposed legislation fails to regulate what is most important with home marijuana grows: safety. In an effort to prevent fires, floods and property damage any future legislation should address a means for inspection. I have heard rumor that regulation may fall on landlords to sign that they are aware of any home grows and that they have been inspected. With respect to this, the Board should be particularly prudent in ensuring that individuals are not forced to self-incriminate with regards to federal legality.

Plant Limit

I do not know if the Board is proposing to create any regulations based on plant numbers, however I would like to strongly advise against this. With the cultivation of marijuana plant numbers matter much less than space. It is possible for someone to have a plant that produces 10 lbs of flowers outdoors and another person to have a plant that produces 10 grams of flowers indoors. Creating plant limits won't limit how much medicine is produced but instead limit the variety of ways in which the medicine may be produced thus preventing some cultivators from being able to follow their own formula. In areas such as Mendocino where cultivation is almost entirely outdoors and each plant produces numerous pounds, plant limits make sense. However, in SC county many of the grows are indoors and

plant limits are unreasonable.

The proposed changes, while an honest effort to regulate a "gray-area" in Santa Cruz County legislation falls short of completing its goals, is extremely costly, non-self-sustaining and would prevent many patients from being able to access affordable medicine. I strongly vote against such a measure and urge the Board to readdress the issue with an effort to take into account the aforementioned points. It is imperative that any proposal take into account the knowledge of those who run dispensaries, cultivate, are collective members and the perspective of patients. If possible, I advise the Board to seek as much information as possible before proposing any changes.

Furthermore, I have attached the (8) enforcement areas with regards to Marijuana from the US DOJ, released on August 29, 2013. I find it interesting that your proposal fails to address any of the areas that the federal government has decided are the *only* important areas of regulation with regards to Marijuana. If you have not had the opportunity to read this policy update you can find it here: http://www.justice.gov/opa/pr/2013/August/13-opa-974.html

Sincerely,
Kaiya Bercow

Community member and Santa Cruz County resident
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(8) Federal Enforcement Areas with Regards to Marijuana

- Preventing the distribution of marijuana to minors;
- Preventing revenue from the sale of marijuana from going to criminal enterprises, gangs, and cartels;
- Preventing the diversion of marijuana from states where it is legal under state law in some form to other states;
- Preventing state-authorized marijuana activity from being used as a cover or pretext for the trafficking of other illegal drugs or other illegal activity;
- Preventing violence and the use of firearms in the cultivation and distribution of marijuana;
- Preventing drugged driving and the exacerbation of other adverse public health consequences associated with marijuana use;
- Preventing the growing of marijuana on public lands and the attendant public safety and environmental dangers posed by marijuana production on public lands; and
- Preventing marijuana possession or use on federal property.