# STUDENT COMPENDIUM: TOPICS IN FOOD LAW AND POLICY

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RESNICK PROGRAM FOR FOOD LAW AND POLICY
UCLA | SCHOOL OF LAW

## STUDENT COMPENDIUM

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# ENVIRONMENTAL REGULATION OF MARIJUANA CULTIVATION IN CALIFORNIA: GOT THE MUNCHIES FOR SOME REGULATION BUT ONLY BORING OLD STICKS ARE ON THE MENU

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INTRODUCTION

> The law ought to prohibit only actions hurtful to society. What is not prohibited by the law, should not be hindered; nor should any one be compelled to that which the law does not require.[1]

Despite serious questions regarding the harmfulness of marijuana,[2] the cultivation of marijuana has been prohibited in California for over 100 years.[3] Notwithstanding prohibition, marijuana is the number one cash crop in the United States' most agriculturally productive state.[4] However, because California's legal regime has traditionally focused on absolute prohibition rather than legalization and regulation, marijuana cultivation in California has resulted in

[1] THE DECLARATION OF THE RIGHTS OF MAN AND OF THE CITIZEN, art. V. (Fr. 1789), *available at* http://www.americanbar.org/content/dam/aba/migrated/2011_build/human_rights/french_dec_rightsofman.authcheckdam.pdf.

[2] Although the United States Drug Enforcement Administration classifies marijuana as a Schedule I drug with "no currently accepted medical use and a high potential for abuse," *Drug Scheduling*, U.S. DRUG ENFORCEMENT ADMIN., http://www.justice.gov/dea/druginfo/ds.shtml (last visited Mar. 26, 2015), twenty-three states (including California) and the District of Columbia have "enacted laws to legalize medical marijuana," *23 Legal Medical Marijuana States and DC*, PROCON.ORG (Jan. 8, 2015, 2:50 PM), http://medicalmarijuana.procon.org/view.resource.php?resourceID=000881. *Compare Drug Fact Sheet: Marijuana*, U.S. DRUG ENFORCEMENT ADMIN., http://www.dea.gov/druginfo/drug_data_sheets/Marijuana.pdf (last visited Mar. 26, 2015) ("No death from overdose of marijuana has been reported.") *with Drug Fact Sheet: Cocaine*, U.S. DRUG ENFORCEMENT ADMIN., http://www.dea.gov/druginfo/drug_data_sheets/Cocaine.pdf (last visited Mar. 26, 2015) ("Overdose effects include agitation, increased body temperature, hallucinations, convulsions and possible death.") *and Drug Fact Sheet: Oxycodone*, U.S. DRUG ENFORCEMENT ADMIN., http://www.dea.gov/druginfo/drug_data_sheets/Oxycodone.pdf (last visited Mar. 26, 2015) ("Overdose effects include: extreme drowsiness, muscle weakness, confusion, cold and clammy skin, pinpoint pupils, shallow breathing, slow heart rate, fainting, coma, and possible death."). That noted, a full weighing of the harms and benefits of marijuana use is beyond the scope of this comment. Therefore, this comment assumes for the sake of argument that although there may be some harms associated with marijuana use, those harms are either outweighed by benefits associated with marijuana use, or those harms are smaller relative to the harms of other substances that are regulated rather than outright prohibited, for instance alcohol or oxycodone.

[3] Dale H. Gieringer, *The Origins of Cannabis Prohibition in California*, CAL. NORML 22−24 (2006), *originally published as The Forgotten Origins of Cannabis Prohibition in California*, 26 CONTEMP. DRUG PROBS. No. 2 (1999), *available at* http://www.canorml.org/background/caloriginsmjproh.pdf (discussing 1913 state law as "bann[ing] possession [of marijuana] *absolutely*" (emphasis added)). *Id.* at 31 ("In 1937, the state did add [marijuana] cultivation as a separate offense. In the next legislature for the first time the word 'marihuana' was written into the law when the narcotics code was rewritten as part of the new Health and Safety Code." (citing Statutes of California, 1939 Chapter 60)). *See also* CAL. HEALTH & SAFETY CODE §§ 11357, 11357.5 11358, 11359, 11360, 11366, 11366.5, 11570 (West 2015) (the current prohibitions on the possession and cultivation of marijuana).

[4] *See Pacific Southwest >> Agriculture Program >> State Agricultural Profiles >> California*, U.S. ENVTL. PROT. AGENCY, http://www.epa.gov/region9/ag/ag-state.html (last visited Mar. 26, 2015) ("California is the nation's most productive agricultural state, and is home to a $35 billion agricultural industry."); *California Top 10 Cash Crops*, NORML, http://norml.org/legal/item/california-top-10-cash-crops (last visited Mar. 26, 2015).

unquestionably harmful impacts to the environment.[5] In other words, the high market demand for marijuana grown in California coupled with absolute prohibition—which has essentially failed—has resulted in a situation where those in California that seek to satisfy that market demand are incentivized to pursue environmentally harmful cultivation practices.[6]

This comment argues that it is high[7] time that California fully legalize and regulate the cultivation of marijuana for all purposes. As a preliminary matter, the legalization and regulation of marijuana will greatly reduce the perverse incentives cultivators of marijuana have to pursue two cultivation strategies with particularly harmful environmental impacts: (1) large-scale industrialized and highly energy-intensive indoor cultivation and (2) outdoor cultivation on public lands. Currently, there are a number of responses in California to regulate or legalize the cultivation of marijuana. However, noticeably absent from the regulatory responses are mechanisms that incentivize sustainable agriculture practices. Rather, the responses focus on heavy-handed, command and control regulation—or defer to a regulator also likely to pursue heavy-handed, command and control regulation. By focusing on command and control regulation and ignoring incentive or market-based environmental regulations, the regulatory responses potentially jeopardize the successful passage of 2016 voter initiatives to fully legalize the cultivation of marijuana—and the environmental benefits likely to come with legalization. After all, one of the key issues from past legalization campaigns in California likely to be present in 2016 is finding a way to regulate the marijuana industry without alienating the pro-marijuana activists and voters.[8]

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[5] The environmental impacts marijuana cultivation in California and their relationship to California's legal regime are discussed in detail in Part I, *infra*.

[6] *See infra* Part I.

[7] Pun intended.

[8] *See* David Downs, *Oregon Medical Marijuana Battles Offer Lessons for California*, LEGALIZATION NATION (May 13, 2015), http://www.eastbayexpress.com/LegalizationNation/archives/2015/05/13/oregon-medical-marijuana-battles-offers-lessons-for-california.

Part I of this comment provides an overview on the prevailing approach to environmental regulation of marijuana cultivation in California, focusing on the prohibitory regime for recreational marijuana and the complete delegation to local governments for regulating medical marijuana. Part I then looks at the two primary cultivation strategies for minimizing the risk of criminal sanctions (large-scale industrialized and highly energy-intensive indoor cultivation and outdoor cultivation on public lands) and the resulting environmental impacts from pursuit of those cultivation strategies. Next, Part II examines the responses altering the prevailing state of environmental regulation, dividing the examination between regulatory actions by state agencies, recently enacted legislation, and past and future voter initiatives. Finally, Part III analyzes and critiques the regulatory responses examined in Part II, in particular focusing on the likelihood that they will result in the adoption of heavy-handed, command and control environmental regulation to the detriment of the legalization voter initiatives in 2016.

It should be noted upfront that the focus of this comment is strictly on California rather than federal environmental regulation. This choice is by design. To begin, "the federal government has traditionally relied on state and local authorizes to address marijuana activity through enforcement of their own narcotics laws."[9] With that, the U.S. Congress passed a spending "measure, which forbids the federal government from using any of its resources to impede state medical marijuana laws . . . ."[10] Furthermore, although federal environmental regulation has been instrumental in curbing the harmful environmental impacts of most other industries, the agriculture industry is either exempt or minimally impacted by the major federal

[9] DEP'T OF JUSTICE, OFFICE OF PUB. AFFAIRS, JUSTICE DEPARTMENT ANNOUNCES UPDATE TO MARIJUANA ENFORCEMENT POLICY (2013), *available at*, http://www.justice.gov/opa/pr/justice-department-announces-update-marijuana-enforcement-policy.

[10] Evan Halper, *Congress quietly ends federal government's ban on medical marijuana*, LOS ANGELES TIMES (Dec. 16, 2014, 4:00 AM), http://www.latimes.com/nation/la-na-medical-pot-20141216-story.html.

environmental regulations, for instance the Clean Air Act and the Clean Water Act.[11] As a result, for the purpose of environmental regulation of marijuana cultivation in California, the State of California is a more important regulatory actor than the federal government.

## I. The PREVAILING STATE OF ENVIRONMENTAL REGULATION

From 1913 until 1996, the State of California prohibited marijuana cultivation for all purposes—recreational or medical.[12] However, in 1996 the voters of California passed Proposition 215, or the Compassionate Use Act of 1996 (hereinafter, the "CUA"), which served, among other things, "[t]o ensure that patients and their primary caregivers who obtain and use marijuana for medical purposes upon the recommendation of a physician are not subject to criminal prosecution or sanction."[13] Then in 2003, the California State Legislature passed the Medical Marijuana Program Act (hereinafter, the "MMPA") (codified as Health and Safety Code sections 11362.7 through 11362.9) to:

> Clarify the scope of the application of the [CUA] and facilitate the prompt identification of qualified patients and their designated primary caregivers in order to avoid unnecessary arrest and prosecution of these individuals and provide needed guidance to law enforcement officers.[14]

Neither the CUA nor the MMPA (referred to collectively hereinafter as, "Prevailing Medical Marijuana Laws") directly addresses environmental regulation of marijuana cultivation.[15] Also, pursuant to a series of California Supreme Court decisions, California's Prevailing Medical Marijuana Laws only afford medical marijuana patients a defense in court rather than any broad

[11] *See* MARY JOE ANGELO ET AL., FOOD, AGRICULTURE, AND ENVIRONMENTAL LAW 149−61, 171−76 (2013).

[12] *See* CAL. HEALTH & SAFETY CODE §§ 11357, 11357.5 11358, 11359, 11360, 11366, 11366.5, 11570 (West 2015) (the current prohibitions on the possession and cultivation of marijuana); *Id.* § 11362.5 (West 2015) ("Added by Initiative Measure (Prop. 215, § 1, approved Nov. 5, 1996)."); Gieringer, *supra* note 3, at 26 (possession of marijuana banned absolutely in 1913).

[13] CAL. HEALTH & SAFETY CODE § 11362.5(B) (West 2015).

[14] 2003 Cal. Stat. ch. 875, § 1(b)(1) (2003).

[15] *See* CAL. HEALTH & SAFETY CODE §§ 11362.5, 11362.7−11362.9 (West 2015).

right to use, possess, distribute, or cultivate marijuana.[16] Building upon that lack of broad right, in *City of Riverside v. Inland Empire Patients Health & Wellness Center*, the California Supreme Court held that the Prevailing Medical Marijuana Laws do not preempt local government "zoning provisions declaring a medical marijuana dispensary, as therein defined, to be a prohibited use, and a public nuisance, anywhere within the [local government's] limits."[17] Right on the heels of *Inland Empire*, California's Third District Court of Appeal held that the Prevailing Medical Marijuana Laws "do not preempt a [local government]'s police power to prohibit the cultivation of [medical] marijuana within that [local government's limits]."[18] Therefore, while at the state level the cultivation of medical marijuana is decriminalized, local governments remain empowered to fully prohibit cultivation. By contrast, cultivation of recreational marijuana is still absolutely prohibited at the state level under the California Health and Safety Code.[19]

The prevailing regulatory regimes can be summarized as follows: (1) For cultivation of recreational marijuana, the regulatory regime is one completely reliant on prohibitory mechanisms (*i.e.*, criminal law enforcement), while (2) for cultivation of medical marijuana, the regulatory

[16] *See* City of Riverside v. Inland Empire Patients Health & Wellness Ctr., Inc., 300 P.3d 494, 506 (Cal. 2013) (reiterating that the CUA "create[s] no broad right to use [medical] marijuana without hindrance or inconvenience" (alteration in original) (internal quotations marks omitted) (quoting Ross v. RagingWire Telecomm., Inc., 174 P.3d 200, 206 (Cal. 2008)); People v. Mower, 49 P.3d 1067, 1072−74 (Cal. 2002) (holding that although the CUA provides the "basis for a motion to set aside an indictment or information prior to trial . . . [and] a defense at trial," the CUA "does not grant any immunity from arrest"). *See also* People v. Clark, 178 Cal. Rptr. 3d 649, 654−57 (2014) (holding a search warrant affidavit does need to show that a defendant's cultivation marijuana is not in conformance with the Prevailing Medical Marijuana Laws to show probable cause); People v. Strasburg, 56 Cal. Rptr. 3d 306, 311 (Ct. App. 2007) (holding that a medical marijuana identification card or physician's recommendation does not prevent law enforcement from investigating a medical marijuana patient); People v. Fisher, 117 Cal. Rptr. 2d 838, 840 (Ct. App. 2002) (holding that a resident's presentation of a valid physician's recommendation under the CUA does not require law enforcement to abandon a search for marijuana authorized by a search warrant). *See also* Damian A. Martin, *California Medical Marijuana Law: The Voters and Legislature Have Made Their Decision; Now Let Them Interpret It!*, 11 J.L. ECON. & POL'Y 105, 115−17 (2015).

[17] *Inland Empire*, 300 P.3d at 506.

[18] Maral v. City of Live Oak, 164 Cal. Rptr. 3d 804, 806 (Ct. App. 2013).

[19] CAL. HEALTH & SAFETY CODE §§ 11357, 11357.5 11358, 11359, 11360, 11366, 11366.5, 11570 (West 2015) (the current prohibitions on non-medical, *i.e.* recreational marijuana).

regime is one completely reliant on delegation to local governments. As described further below, each of these regulatory regimes has its respective environmental consequences.

### A. *Absolute Prohibition of Recreational Marijuana—Go Indoors or onto Public Land*

Notwithstanding prohibition, "[m]arijuana is the third most popular recreational drug in America (behind only alcohol and tobacco)," "some 25 million Americans have smoked marijuana in the past year, and more than 14 million do so regularly despite harsh laws against its use."[20] With that:

> The principal economic theory of supply and demand dictates that when a demand for a product is high, and supply short, prices for that product will rise. If supply, for whatever reason, is controlled or suppressed and demand remains high, profiteers will seek to satisfy the demand illicitly. If the substance can be grown easily, or does not require complex procedures to manufacture and is not particularly dangerous to use, then it is all the more difficult to restrain the product's availability. Enter marijuana: it can be grown by any person with seeds, soil, minimal gardening supplies and, preferably, if one seeks to avoid prosecution, seclusion.[21]

In other words, because of high market demand and large profit margins, individuals are willing to take the risk of criminal sanctions in cultivating recreational marijuana. However, like any rational actor would, those individuals pursue cultivation strategies that minimize the risk of criminal sanctions.[22] The two primary cultivation strategies for minimizing the risk of criminal

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[20] *About Marijuana*, NORML, http://norml.org/aboutmarijuana (last visited Mar. 26, 2015). *See also DrugFacts: Nationwide Trends*, NAT'L INST. ON DRUG ABUSE, http://www.drugabuse.gov/publications/drugfacts/nationwide-trends (last visited Dec. 31, 2015) ("In 2013, there were 19.8 million current users [of marijuana]—about 7.5 percent of people aged 12 or older—up from 14.5 million (5.8 percent) in 2007.").

[21] Warren Eth, *Up in Smoke: Wholesale Marijuana Cultivation Within the National Parks and Forests, and the Accompanying Extensive Environmental Damage*, 16 PENN ST. ENVTL. L. REV. 451, 467 (2008) (citations omitted).

[22] In case it was not already apparent, the target of this comment's critique is the current system for regulating the cultivation of marijuana and not the individuals acting within that poorly designed system. To quote colloquially from rapper, singer, and actor, Tracy Lauren Marrow, better known by his stage name Ice-T—"Don't hate the player, hate the game." ICE-T, *Don't Hate the Playa*, *on* THE SEVENTH DEADLY SIN (Priority Records 1999).

sanctions are (1) "large-scale industrialized and highly energy-intensive indoor cultivation"[23] and (2) outdoor cultivation on public lands.[24] Each of these cultivation strategies has adverse environmental consequences that could be controlled or mitigated if marijuana cultivation was legalized and regulated, rather than prohibited.[25] If the cultivation of marijuana was legalized and regulated, regulators could specifically focus efforts and resources on curbing environmental impacts of those cultivators participating in a legal market.[26]

### 1. Environmental Impacts of Large-Scale Industrialized Indoor Cultivation

Because of the need to replicate ideal outdoor conditions,[27] cultivating marijuana indoor is energy intensive. The energy costs associated with replicating ideal outdoor conditions are the primary environmental impact of large-scale industrialized indoor cultivation. "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

[23] *See* Evan Mills, *The carbon footprint of indoor* Cannabis *production*, 46 ENERGY POL'Y. 58, 58 (2012) ("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 . . . ." (citations omitted)).

[24] *See* Dana Kelly, *Bringing the Green to Green: Would the Legalization of Marijuana in California Prevent the Environmental Destruction Caused by Illegal Farms?*, 18 HASTINGS W.-N.W. J. ENVTL. L. & POL'Y 95, 98 (2012).

[25] *See* Mills, *supra* note 23, at 61 ("If improved practices applicable to commercial agricultural greenhouses are any indication, such large amounts of energy are not required for indoor *Cannabis* production." (footnote omitted)); *See* Eth, *supra* note 21, at 467 ("[Marijuana] can be grown 'environmentally' friendly, or organically, assuming one can erect netting to avoid insects and take other growing precautions."). Advocating one form of cultivation over the other (indoor or outdoor) is beyond the scope of this comment. The forgoing and forthcoming is to merely illustrate that the absolute prohibition of marijuana brings out the worst in either method of cultivation.

[26] This comment acknowledges that even after the legalization of marijuana a black market would still exist where some cultivators of marijuana would still pursue cultivation strategies that have adverse impacts on the environment and where regulatory authority does not reach. Notwithstanding the above, legalization and regulation will unquestionably reduce the size and impact of the current black market. See, for example, what happened with the legalization and regulation of marijuana in Colorado: although some black market cultivators have thrived due to the high taxes on legal marijuana, other black market cultivators have been forced out of the market. Ricardo Baca, *How the legalization of pot forced this weed grower out of his illegal business*, THE CANNABIST, THE DENVER POST (Dec. 26, 2014, 4:17 PM), http://www.thecannabist.co/2014/12/26/black-market-marijuana/26106/.

[27] For example, "provision of light, fresh air ventilation, cooling (required due to the energy density of lighting and ventilation) and control of pests and fungal agents." MICHAEL O'HARE ET AL., ENVIRONMENTAL RISKS AND OPPORTUNITIES IN CANNABIS CULTIVATION 4−5 (2013), *available at* http://lcb.wa.gov/publications/Marijuana/SEPA/BOTEC_Whitepaper_Final.pdf.

irrigation water, generation of carbon dioxide by burning fossil fuel, and ventilation and air-conditioning to remove waste heat."[28] In addition to the baseline energy costs associated with replicating outdoor conditions, further costs arise from the efforts of indoor cultivators to avoid detection.[29] All told, the energy requirements for large-scale industrialized indoor cultivation are comparable to those of hospital operating rooms or modern datacenters,[30] and indoor cultivation of marijuana "is responsible for about three percent of all electricity use" in California.[31]

In addition to energy costs, replicating ideal outdoor conditions also generates environmental impacts in the use of water and the disposal of lighting materials. Indoor cultivation of marijuana is water-intensive, particularly when grown hydroponically.[32] "[H]ydroponic systems produce more nutrient pollution than other [indoor] growing methods."[33] For example, water used for hydroponic systems is often diverted from local streams causing negative impacts "on pH, stream flow, water temperature, and nutrient content."[34] For the disposal of lighting materials, the high-intensity light bulbs typically used in large-scale industrialized indoor cultivation "are not recyclable."[35] As a result, O'Hare et al. "estimate that there is the potential for 30 milligrams of mercury pollution per kilogram of [marijuana] product if proper disposal is not practiced."[36]

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[28] *See* Mills, *supra* note 23, at 59.

[29] For example, "air cleaning, noise and odor suppression, and inefficient electric generators used to avoid conspicuous utility bills." *See id.*

[30] *See id.*

[31] *Id.* at 59−60 ("This corresponds to the electricity use of one million average California homes, greenhouse-gas emissions equal to those from one million average cars, and energy expenditures of $3 billion per year.").

[32] O'HARE ET AL., *supra* note 27, at 14 ("This level of water application is much higher than traditional soil-grown water application.").

[33] *Id.*

[34] *Id.* (citations omitted).

[35] *Id.* at 18.

[36] *Id.* ("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.").

### 2. Environmental Impacts of Outdoor Cultivation on Public Lands

Although it may seem counterintuitive (*i.e.*, why would cultivators of illegal marijuana seeking to avoid criminal sanctions cultivate marijuana on land owned by the government?), public lands provide ideal grounds for illegal marijuana cultivation and avoiding criminal sanctions because (1) the remoteness of the land,[37] (2) the limited presences of law enforcement personnel,[38] and (3) the ability to disclaim ownership or tenancy. In other words:

> The sites that are most appealing for illegal farms are wooded areas, far from any town or road. Horribly, these tend to be areas preserved for habitat restoration and conservation. Indeed, seventy percent of the plants confiscated by police in 2009 were grown on public or protected land.[39]

"When mismanaged," outdoor cultivation of marijuana (and agriculture in general), results in "multiple environmental impacts aside from energy use."[40] In other words, "[i]llicit marijuana cultivation operations in California on *both public and private lands* increasingly pose risks to the environment, natural resources, wildlife, agriculture, and public safety."[41] However, the tendency to use environmentally harmful agricultural practices is exacerbated with illegal marijuana cultivation on public lands because "the growers are trespassing" and, therefore, "have no interest in maintaining the long-term quality of the land."[42] Moreover, the environmental impact on public

[37] Eth, *supra* note 21, at 448 (citations omitted) (internal quotations omitted).
[38] *Id.*
[39] Kelly, *supra* note 24, at 98.
[40] Mills, *supra* note 23, at 63. *See also* Kelly, *supra* note 24, at 98 ("Growing marijuana outdoors is, in many ways, just like growing any other crop. Bugs and rodents cause problems and the soil needs to be rich.").
[41] Marijuana Cultivation on U.S. Public Lands: Hearing Before the S. Caucus on Int'l Narcotics Control, 112th Cong. 8 (2011) (statement of Margaret Mims, Sheriff, Sheriff, Fresno Cnty., Cal.) (emphasis added), *available at* https://www.hsdl.org/?view&did=695923.
[42] Kelly, *supra* note 24, at 98. *See also* Eth, *supra* note 21, at 468 ("The fertilizers, pesticides and poisons could be used in abundance, because obviously, this is not the grower's property, and after the harvest the grower could abandon everything, including wastes, trash and tools and move on.").

land has greater magnitude because public lands are often specifically set aside to preserve precious natural resources.[43]

Essentially then, the outdoor cultivation of marijuana on public lands represents the confluence of almost every imaginable environmentally harmful agricultural practice in a single instance. Stated differently—"[e]very step of the growing process causes environmental damage."[44] Given the extensive nature of environmental harm, it is probably most impactful to list out the steps in the process and the resulting environmental harms. To illustrate:

> (1) Illegal growers enter public land and select a site. They bring with them "thousands of pounds of fertilizers, poisons, food, tents, irrigation hoses, seeds, shovels, hoes, guns, beer cans and a host of other contraband . . . ."[45]
>
> (2) Once a site is selected, the illegal growers must clear it.[46] If the site is on a hillside as is often the case, the illegal growers must then terrace the site.[47] These clearing and terracing activities lead to further environmental harm through erosion.[48]
>
> (3) Additional site preparations include the illegal growers securing a water source. Often, "[t]he [illegal] growers lay black tubing down on the forest floor to redirect the natural mountain streams to their farms."[49] As a result, streams and rivers lose the instream flows necessary to support wildlife.[50]
>
> (4) Once the site is prepared, the illegal growers liberally and haphazardly apply fertilizer and pesticides.[51] Compounding the problem, fertilizer and pesticides are often not properly stored on the

[43] Eth, *supra* note 21, at 458 (citations omitted) (internal quotations omitted).
[44] *Id.* at 470.
[45] *Id.* at 470.
[46] *Id.* at 471−72.
[47] *Id.* at 472 (citations omitted).
[48] *Id.* at 472 (citations omitted).
[49] *See* Kelly, *supra* note 24, at 98 (citations omitted). *See also* Eth, *supra* note 21, at 468 ("The fertilizers, pesticides and poisons could be used in abundance, because obviously, this is not the grower's property, and after the harvest the grower could abandon everything, including wastes, trash and tools and move on.").
[50] *See id.* ("For example, in 1996 the Coho Salmon was listed as threatened. By 2005, it was listed as endangered." (citations omitted)).
[51] *See* Eth, *supra* note 21, at 473−74.

grow site.[52] The fertilizer and pesticides then run off the grow site to "streams and dammed ponds and saturate[] the ground."[53]

(5) Often times, illegal growers live at the site throughout the growing season "eating, drinking, hunting and generating human waste and trash."[54]

(6) Finally, after harvest, the illegal growers can just abandon the site leaving cleanup problems for the public.[55] However, cleanup is often not possible "because a shortage of money and manpower" for the responsible government agencies.[56]

### B. *Local Regulation of Medical Marijuana—Stay Indoors or Move Outdoors to a Locality with Permissive Laws*

With the absolute prohibition of recreational marijuana as a baseline, attention can be turned towards the environmental consequences of the prevailing medical marijuana regulatory regime. As indicated above in Part I, the Prevailing Medical Marijuana Laws do not directly address environmental regulation of medical marijuana cultivation, and the California Courts have interpreted the Prevailing Medical Marijuana Laws as providing wide latitude for local governments to regulate and restrict medical marijuana cultivation. The confluence of these two factors has led to what can accurately be described as "a 'hodgepodge' of varying local rules for the cultivation and distribution of [medical] marijuana."[57] Table I provides a high-level summary of the regulatory characteristics particularly relevant to the analysis here.[58]

[52] *See id.* at 474.
[53] *Id.* at 471−72 (citations omitted).
[54] *Id.* at 476 (citations omitted).
[55] *See id.* at 474.
[56] *Id.* at 476 (citations omitted).
[57] *See* Kelly, *supra* note 24, at 100 (citations omitted). *See infra* App. A.
[58] *See infra* Table I.

TABLE I.
SUMMARY OF LOCAL GOVERNMENT MEDICAL MARIJUANA REGULATIONS[59]

| Type of Cultivation Regulations | Number of Local Governments |
|---|---|
| Have Environmental Regulation Provisions (Other than Bans) | 1 |
| Ban All Cultivation (Outright or Effectively) | 20 |
| Ban Outdoor Cultivation (or Require Cultivation in Enclosed Structure) | 44 |

Immediately, it is worth noting that despite (1) the wide latitude local governments have received from the California Courts; (2) the environmental impacts of unregulated marijuana cultivation; and (3) the ineffectiveness of absolute prohibition in curbing those environmental impacts, only one local government has included targeted environmental regulation in its medical marijuana ordinance—the City of Arcata.[60] In 2012, voters of the City of Arcata passed Measure I (hereinafter, "Arcata's Excessive Residential Electricity Users Tax"),[61] which assesses "a forty-five percent tax on residential household meters that use more than 600 percent of baseline electricity or more than an average of three residential households from one meter."[62] Although not mentioned in the actual ordinance language, Arcata's Excessive Residential Electricity Users Tax specifically targets the environmental impacts of large-scale industrialized and highly energy-

[59] Data compiled by Damian A. Martin from the following source: App. A, *infra*.

[60] *See infra* App. A.

[61] ARCATA, CAL., MUN. CODE § 2628.5 (2015). Because Arcata's Excessive Residential Electricity Users Tax passed by over two-thirds of the vote, it would qualify as permissible "special tax" under article 13A, section 4 of the California Constitution and not implicate the Fourth District Court of Appeal's recent decision in *Capistrano Taxpayers Ass'n, Inc. v. City of San Juan Capistrano*, 235 Cal. App. 4th 1493, 1497−98 (2015), holding graduated water rates for higher-volume users unconstitutional. *City of Arcata Residential Electricity Users Tax, Measure I (November 2012)*, BALLOTPEDIA, http://ballotpedia.org/City_of_Arcata_Residential_Electricity_Users_Tax,_Measure_I_(November_2012) (last visited July 1, 2015).

[62] *Excessive Electricity Use Tax*, CITY OF ARCATA, http://www.cityofarcata.org/node/1645 (last visited Mar. 28, 2015).

intensive indoor marijuana cultivation.[63] Besides its uniqueness relative to other local governments in California, Arcata's Excessive Residential Electricity Users Tax is also noteworthy in that it is an incentive or market-based environmental regulation[64] conceptually similar to a tax recommended by O'Hare et al. for promoting environmentally responsible marijuana cultivation in Washington state[65] and a tax recently proposed by Boulder County, Colorado.[66]

Rather than instituting thoughtful and targeted environmental regulation, many local governments have responded to the wide latitude received from the California Courts by either banning outdoor cultivation or banning all cultivation.[67] The typical rationales local governments provide for banning medical marijuana cultivation are "significant impacts on the [locality]" such as "damage to buildings, dangerous electrical alterations and use, inadequate ventilation, increased robberies and other crime, and the nuisance of strong and noxious odors."[68] When a local government enacts a ban, medical marijuana cultivation is on the same footing as recreational marijuana cultivation from an environmental perspective—cultivators are incentivized to pursue one of the two particularly harmful cultivation strategies discussed above (industrialized and highly energy-intensive indoor cultivation or outdoor cultivation on public lands).[69] Given that

[63] *See* SHANE BRINTON ET AL., ARGUMENT IN FAVOR OF MEASURE I (2012).

[64] *See* O'HARE ET AL., *supra* note 27, at 23.

[65] *Id.* at 24 ("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. . . . This additional climate fee would amount to approximately a twenty percent surcharge on electricity use.").

[66] Jan Lee, *Boulder County Proposes Cannabis Carbon "Tax"*, TRIPLE PUNDIT (Nov. 25, 2014), http://www.triplepundit.com/2014/11/boulder-county-imposes-cannabis-carbon-tax/ ("[T]he county plans to levy a charge of 2.16 cents per *kWh* . . . . The county sees this as a carbon tax of sorts that would offset the impact of carbon emissions from cannabis."). It should be recognized that both Washington and Colorado have legalized the cultivation of recreational marijuana, unlike California. *See State Marijuana Laws Map*, Governing, http://www.governing.com/gov-data/state-marijuana-laws-map-medical-recreational.html (last visited Mar. 28, 2015).

[67] *See supra* Table I.

[68] *Maral*, 164 Cal. Rptr. 3d at 806 (citations omitted).

[69] *See supra* Part I.A.

much of the public land in question is federal land with federal law enforcement[70] and California affords medical marijuana cultivators a defense in court,[71] rational medical marijuana cultivators will likely choose the large-scale industrialized and highly energy-intensive indoor cultivation option.[72]

Moreover, since the Prevailing Medical Marijuana Laws do not provide a defense in court for violations of local medical marijuana ordinances[73] and local government environmental regulation of medical marijuana cultivation is basically all-or-nothing,[74] the regulatory regime for medical marijuana cultivation incentivizes cultivators to pursue an additional strategy with particularly harmful environmental consequences: (3) outdoor cultivation within a locality that has permissive medical marijuana laws. In other words, as more and more local governments ban medical marijuana cultivation, increasing amounts of medical marijuana must be cultivated within the local governments that do permit medical marijuana cultivation. Given that none of the local governments that permit medical marijuana cultivation (other than the City of Arcata) have targeted environmental regulations, those communities experience disproportionate environmental impacts. The case in point is Mendocino County which "has suffered some of the worst environmental consequences of marijuana cultivation" due to "[a] combination of *permissive local laws*, rich soil, compatible temperature, and huge forests used for camouflage."[75] Overall then,

[70] *See* Eth, *supra* note 21, at 456 ("While states can enforce laws on federal lands, state law enforcement agencies tend to be busy policing their counties and municipalities, leaving parks and forests to the Park Rangers and the Forest Rangers respectively.").

[71] *See supra* note 16.

[72] *See* Mills, *supra* note 23, at 63−64 (noting a study that "identified a 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)." (citing MAXIMILIAN AUFFHAMMER & ANIN AROONRUENGSAWAT, UNCERTAINTY OVER POPULATION, PRICES OR CLIMATE? IDENTIFYING THE DRIVERS OF CALIFORNIA'S FUTURE RESIDENTIAL ELECTRICITY DEMAND (2010)).

[73] *See supra* note 16.

[74] Either a local government bans medical marijuana cultivation in some fashion or a local government permits medical marijuana cultivation but does nothing in the way of environmental regulation.

[75] Kelly, *supra* note 24, at 97.

local governments banning the cultivation of medical marijuana has a similar negative impact on the environment as the absolute prohibition on recreational marijuana cultivation.

## II. RESPONSES TO CHANGE THE PREVAILING REGULATORY REGIME

Recently, "[t]here have been a number of reports on environmental damage in California caused by marijuana cultivation."[76] For example:

> (1) Used oil from generators powering an underground marijuana greenhouse contaminating drinking water.[77]
>
> (2) Pesticide residues at levels 1,600 times the legal digestible amount from medical marijuana samples collected in Los Angeles.[78]
>
> (3) Poisoned of Pacific fisher weasels and endangered spotted owls linked to marijuana cultivators using rat poison "to protect their plants from wood rats."[79]
>
> (4) Increased habitat loss for the already threatened coho salmon due to marijuana cultivators diverting "millions of gallons of water from salmon streams."[80]

In addition to the reports of environmental damage, marijuana cultivation has been accused of contributing to California's worsening drought.[81] Due in part (and at times directly related) to the

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[76] Aaron Juchau, *Marijuana Could Lead to a Paradigm Shift in Environmental Stewardship*, DRUG POLICY ALLIANCE (June 20, 2014), http://www.drugpolicy.org/blog/marijuana-could-lead-paradigm-shift-environmental-stewardship.

[77] Kelly, *supra* note 24, at 96 (citations omitted).

[78] Lynne Peeples, *Marijuana Pesticide Contamination Becomes Health Concern As Legalization Spreads*, HUFFPOST GREEN (May 24, 2013, 7:44 AM), http://www.huffingtonpost.com/2013/05/24/marijuana-pesticides-contamination_n_3328122.html.

[79] Felicity Barringer, *Marijuana Crops in California Threaten Forests and Wildlife*, THE NEW YORK TIMES (June 20, 2013), http://www.nytimes.com/2013/06/21/us/marijuana-crops-in-california-threaten-forests-and-wildlife.html?_r=0.

[80] Jeff Barnard, *Marijuana Farming Threatens Salmon As Water Is Diverted From Streams, Biologists Say*, HUFFPOST GREEN (Nov. 30, 2014, 5:59 AM), http://www.huffingtonpost.com/2014/09/30/marijuana-farming-threatens-salmon_n_5907476.html.

[81] Sean Breslin, *Marijuana: Another Contributor to California's Drought*, WEATHER.COM (Apr. 10, 2014, 12:04 PM), http://www.weather.com/science/environment/news/marijuana-farms-california-drought-20140409 ("Marijuana growing is a budding business in America as laws are relaxed on pot use in several states, but as California's drought continues to worsen, these thirsty plants, whether grown lawfully or illegally, aren't helping the problem.").

increased visibility of the environmental impacts of marijuana cultivation, there are a number of responses from regulatory actors that will alter the prevailing regime and regulate or legalize the cultivation of marijuana—medical and recreational.

As a first step, the California's State Water Resources Control Board and Regional Water Quality Control Boards (collectively hereinafter, the "California Water Boards") along with the California Department of Fish and Wildlife (hereinafter, the "CDFW") developed a strategy to finally bring marijuana cultivation within their current regulatory frameworks. Next, the California Legislature enacted comprehensive legislation that will comprehensively tax and regulate the medical marijuana industry (including cultivation). In particular, this comprehensive legislation expands and facilitates the regulatory work being started by the California Water Boards and CDFW. Taken together, the regulatory proposals by the California Water Boards, the CDFW, and the California Legislature begin the process of regulating marijuana cultivation. In particular, regulators finally are beginning to focus efforts and resources on curbing environmental impacts of those cultivators participating in a legal market for medical marijuana.

Most importantly, there are already a number of voter initiatives planned for 2016 to fully legalize marijuana, including cultivation. Although the actions of the California Water Boards, the CDFW, and the California Legislature are important in that they shift the focus from prohibition to regulation, the 2016 voter initiatives on the full legalization of marijuana are likely to have the greatest positive impact on marijuana cultivation and the environment. Legalization greatly eliminates the perverse incentives marijuana cultivators have to pursue the harmful environmental practices discussed in Part I, *supra*. For instance, "if there are other lawful places to grow marijuana, there would be no reason to grow it clandestinely on public lands."[82]

[82] Eth, *supra* note 21, at 482.

Notwithstanding the likely environmental benefits to come from the regulatory responses discussed further below, they all either focus on heavy-handed, command and control regulation or defer to a regulator also likely to pursue heavy-handed, command and control regulation.

A. *Regulatory Actions by State Agencies*

In 2013, local politicians concerned about the environmental and water impacts of marijuana cultivation began questioning the rationale behind the California Water Boards' position not to regulate medical marijuana cultivation.[83] Although the California Water Boards have a duty to ensure that *all* water discharges do not result in pollution or nuisance and comply with promulgated water quality control plans,[84] the Water Boards were concerned about (1) the ability for Water Boards' staff to distinguish cultivation sites legal under the Prevailing Medical Marijuana Laws and (2) the fact that Water Boards' "staff are not trained peace officers . . . ."[85] In response to concerns regarding its law enforcement capacity, the California Water Boards formed a regulatory partnership with the CDFW, which had recently created a "Marijuana Enforcement Team."[86] The CDFW "has jurisdiction over the conservation, protection, and management of California's fish, wildlife, native plants, and habitats" to include "authority over water quality protection as it relates to fish and wildlife."[87] Of particular relevance here, the CDFW recently received authority for its officer in charge of marijuana-related enforcement issues

[83] CALIFORNIA STATE WATER RESOURCES CONTROL BOARD, CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARDS & CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE, STRATEGY: REGULATION AND ENFORCEMENT OF UNAUTHORIZED DIVERSIONS; DISCHARGES OF WASTE TO SURFACE AND GROUNDWATER CAUSED BY MARIJUANA CULTIVATION §§ 1−2 [hereinafter CALIFORNIA WATER BOARDS & CDFW REGULATORY STRATEGY], *available at* http://www.waterboards.ca.gov/water_issues/programs/enforcement/docs/2014strategicplan_wbcdfw.PDF.

[84] *Id.* § 4.1 (citing CAL. WATER CODE §§ 13263, 13304, 13350, 13375).

[85] *Id.* § 2.

[86] *Id.* § 1 (A unit "of wildlife officers focused primarily on marijuana enforcement.").

[87] *Id.* § 4.2 (citing CAL. FISH & GAME CODE § 1802).

to (1) impose civil penalties related to its water quality jurisdiction through administrative proceedings and (2) adopt regulations to enforce those penalties.[88]

Under their regulatory partnership, the California Water Boards and CDFW developed "a multi-agency strategy for regulation and enforcement of marijuana cultivators" (hereinafter, the "California Water Boards & CDFW Regulatory Strategy").[89] The California Water Boards & CDFW Regulatory Strategy is primarily focused on four areas of implementation—(1) inspections, (2) permitting, (3) enforcement, and (4) education and outreach.[90] For inspections, the California Water Boards & CDFW Regulatory Strategy initiated a pilot program whereby joint inspection teams of California Water Boards staff, CDFW biologists and wildlife officers, and local law enforcement visit marijuana cultivation sites to ensure cultivation operations "are [not] impacting nearby waterways and wildlife."[91] Overall, the intent of the inspections program is to encourage cooperation in the California Water Boards & CDFW Regulatory Strategy's permit programs and provide a mechanism for initiating enforcement actions.[92]

As for permitting, the California Water Boards & CDFW Regulatory Strategy required the North Coast and Central Valley Regional Water Boards to, respectively, "develop permit structures that will provide terms and conditions applicable to marijuana cultivation operations with the objective of developing a self-sustaining, fee-based regulatory program within a

[88] CAL. FISH & GAME CODE § 12025 (West 2015); *Id.*

[89] CALIFORNIA WATER BOARDS & CDFW REGULATORY STRATEGY, *supra* note 83, § 1.

[90] *See id.* § 7.0; Mary Callahan, *State seeks water rules for pot growers*, THE PRESS DEMOCRAT (Jan. 29, 2015, 9:49 PM), http://www.pressdemocrat.com/home/3451589-181/state-seeks-water-rules-for.

[91] CAL. ENVTL. PROT. AGENCY, STATE WATER RESOURCES CONTROL BOARD, MULTI-AGENCY CANNABIS PILOT PROJECT FINISHES SUCCESSFUL THREE-DAY INSPECTION OF MARIJUANA GROWS IN EEL RIVER WATERSHED 1 (2015), *available at* http://www.waterboards.ca.gov/press_room/press_releases/2015/pr012215_sproul_creek.pdf.

[92] *Id.* at 2 ("The [California] Water Boards and CDFW hope that most or many of the growers will be interested in working with state and local agencies cooperatively to prepare for and then enroll in permits that may be required, such as a conditional waiver of waste discharge requirements and/or streambed alteration agreement. . . . Following issuance of those reports, formal enforcement orders may follow from the North Coast Regional Water Quality Control Board and/or State Water Board to ensure compliance with all applicable Water Code provisions.").

reasonable time."[93] On August 13, 2015,[94] the North Coast Regional Water Board, and, on October 2, 2015,[95] the Central Valley Regional Water Board, respectively adopted permit programs for marijuana cultivation. Both Permit Programs divide covered marijuana cultivation sites into three tiers with increased regulatory burdens for higher tier levels[96] but include detailed sets of general requirements and best management practices, which are mandatory obligations for all applicable cultivators.[97] Overall, the North Coast and Central Valley Regional Water Boards' permit programs are the centerpiece of the CDFW & State Water Board Regulatory Strategy since all the other components of Strategy tie into the Water Board permit programs. With that, the CDFW & State Water Board Regulatory Strategy does not even require the CDFW to develop its own marijuana cultivation permit program. Rather, the CDFW will continue to use its existing permitting framework under California Fish and Game Code section 1602.[98] However, acquisition of a California Fish and Game Code section 1602 permit from the CDFW is required to comply with the both the North Coast and Central Valley Regional Water Boards' permit programs.[99]

[93] CALIFORNIA WATER BOARDS & CDFW REGULATORY STRATEGY, *supra* note 83, § 7.1.

[94] CALIFORNIA STATE WATER RESOURCES CONTROL BOARD, *North Coast Regional Water Board Adopts Order for Cannabis Cultivation and Similar Activities* 1 (Aug. 13, 2015), *available at* http://www.swrcb.ca.gov/water_issues/programs/enforcement/docs/150813_cannabis_order.pdf.

[95] CENTRAL VALLEY REGIONAL WATER QUALITY CONTROL BOARD, *Central Valley Water Board Adopts Order Regulating Cannabis Cultivation to Protect Water Quality* 1 (Oct. 2, 2015), *available at* http://www.waterboards.ca.gov/centralvalley/press_room/announcements/press_releases/pr100215_r5cannabis_order.pdf.

[96] *Compare* NORTH COAST REGIONAL WATER QUALITY CONTROL BOARD, ORDER NO. 2015-0023, WAIVER OF WASTE DISCHARGE REQUIREMENTS AND GENERAL WATER QUALITY CERTIFICATION FOR DISCHARGES OF WASTE RESULTING FROM CANNABIS CULTIVATION AND ASSOCIATED ACTIVITIES OR OPERATIONS WITH SIMILAR ENVIRONMENTAL EFFECTS IN THE NORTH COAST REGION STATE WATER RESOURCES CONTROL BOARD 6−8 (2015) [hereinafter ORDER NO. 2015-0023] *with* CENTRAL VALLEY REGIONAL WATER QUALITY CONTROL BOARD, ORDER R5-2015-0113, WASTE DISCHARGE REQUIREMENTS GENERAL ORDER FOR DISCHARGES OF WASTE ASSOCIATED WITH MEDICINAL CANNABIS CULTIVATION ACTIVITIES 9−11 (2015) [hereinafter ORDER R5-2015-0113].

[97] *Compare* ORDER NO. 2015-0023, *supra* note 96, at 8, 31 *with* ORDER R5-2015-0113, *supra* note 96, at 9.

[98] CALIFORNIA WATER BOARDS & CDFW REGULATORY STRATEGY, *supra* note 83, § 7.1 (citing CAL. FISH & GAME CODE § 1602).

[99] *See* ORDER NO. 2015-0023, *supra* note 96, app. D at 1; ORDER R5-2015-0113, *supra* note 96, at 5.

As for enforcement, both the California Water Boards and CDFW will respectively leverage their current statutory and regulatory frameworks.[100] "Enforcement actions will be determined based on evidence obtained during an inspection."[101] However, because inspections involve personnel from the California Water Boards, the CDFW, and local law enforcement, the CDFW & State Water Board Regulatory Strategy includes the development of agreements and "procedures for determining [the] lead agency for prosecution purposes."[102] Again as with inspections, enforcement compliments the California Water Boards & CDFW Regulatory Strategy's permit programs as cases before the California Water Boards will enforce conditions of the permit programs.[103]

Finally, for education and outreach, the California Water Boards & CDFW Regulatory Strategy calls for a four-pronged approach designed to encourage enrollment in the Strategy's permit programs,[104] which involves:

> (1) "Establish[ing] working relationships with marijuana industry groups"[105];
>
> (2) "Disseminat[ing] information to construction industry groups"[106];
>
> (3) "Develop[ing] a reference guide [to] post and distribute"[107]; and
>
> (4) "[P]ubliciz[ing] enforcement actions against responsible parties."[108]

[100] *See* CALIFORNIA WATER BOARDS & CDFW REGULATORY STRATEGY, *supra* note 83, § 7.3.1.
[101] *Id.* § 7.3.
[102] *Id.* § 7.3.
[103] *Id.* § 7.3.1.
[104] *See id.* § 7.4 (citations omitted).
[105] *Id.* § 7.4.
[106] CALIFORNIA WATER BOARDS & CDFW REGULATORY STRATEGY, *supra* note 83, § 7.4.
[107] *Id.*
[108] *Id.*

Notwithstanding all of the above, the California Water Boards & CDFW Regulatory Strategy "explicitly state[s] that it does not in any way authorize, endorse, sanction, permit or approve the cultivation, use, or sale of marijuana"[109] and "anticipate[s] that in many cases, staff would serve to support the relevant County Counsel or District Attorney's office, or Attorney General's office in [criminal] prosecution."[110]

The fact that the CDFW & State Water Board Regulatory Strategy entirely leverages the California Water Boards' and CDFW's existent regulatory authority begs the question: Why address the environmental impacts of marijuana cultivation separately from the environmental impacts from the rest of agriculture in California? The California Water Boards & CDFW Regulatory Strategy insistence on emphasizing "that it does not in any way authorize, endorse, sanction, permit or approve the cultivation, use, or sale of marijuana" provides some explanation. In a published but un-citable opinion, *Pack v. Superior Court*, California's Second District Court of Appeal held that "state and local laws which license the large-scale cultivation and manufacture of marijuana stand as an obstacle to federal enforcement efforts" and are thus preempted by federal law.[111] The California Attorney General has cautioned that "the *Pack* decision suggests if the Sate goes too far in regulating medical marijuana enterprises (by permitting them, requiring license or registration fees, or calling for mandatory testing of marijuana), the law might be preempted by the [federal] Controlled Substances Act."[112] Therefore, although it is possible in theory for California agencies to regulate marijuana cultivation under authority used to regulate agriculture

[109] *Id.* § 4.1.
[110] *Id.* § 7.3.2.
[111] Pack v. Superior Court, 132 Cal. Rptr. 3d 633, 653 (Ct. App. 2011), *review granted and opinion superseded sub nom.* Pack v. S.C., 268 P.3d 1063 (Cal. 2012).
[112] Memorandum from Cal. Att'y Gen. Kamala D. Harris to S. President Pro-Tempore Hon. Darrell Steinberg & Speaker of the Assemb. Hon. John A. Perez, at 3 (Dec. 21, 2011).

in general, because of concerns with preemption by federal law, California agencies will not do so without some external pressure—enter the California Legislature.

B. *The Medical Marijuana Regulation & Safety Act*

In the years following the passage of the MMPA, the California Legislature regularly considered bills to comprehensively tax and regulate both medical and recreational marijuana.[113] Finally, on the last day of its 2015 session, the California Legislature passed the Medical Marijuana Regulation and Safety Act (hereinafter, "MMRSA").[114] MMRSA creates a comprehensive scheme for the licensure and regulation of all aspects of the medical marijuana industry in California, including indoor and outdoor cultivation.[115] One of the more prominent structural features of MMRSA is a parallel regulatory track where medical marijuana cultivation is regulated simultaneously at the state and local level. To demonstrate, a person cultivating medical marijuana under MMRSA is required to possess both a "state license" issued by the California Department of Food and Agriculture (hereinafter, the "CDFA") and a "permit" from a local government.[116] However, local governments also retain the power to ban medical marijuana cultivation under MMRSA.[117] In other words, MMRSA merely sets minimum standards upon which local governments can add more stringent regulatory requirements up to and including complete bans.[118]

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[113] *See Legislative News*, CAL. NORML, http://www.canorml.org/legislative_news (last visited Mar. 29, 2015). For example, in Assembly Bill 2254 (from the 2009−2010 session), the Marijuana Control, Regulation, and Education Act of 2010, would have legalized marijuana for recreational purposes with a comprehensive regulatory program administered by the Department of Alcoholic Beverage Control. *See* Assemb. B. 2254, 2009−2010 Reg. Sess., at Legislative Counsel's Digest (Cal. 2010) (as introduced).

[114] The California Legislature passed MMRSA in three separate bills: Assembly Bill No. 243, Assembly Bill No. 266, and Senate Bill No. 643. California Governor Jerry Brown signed Assembly Bill No. 243, Assembly Bill No. 266, and Senate Bill No. 643 into law on October 9, 2015. EDMUND G. BROWN JR., OFFICE OF THE GOVERNOR OF THE STATE OF CAL., *Governor Brown Issues Legislative Update* (Oct. 9, 2015), *available at* https://www.gov.ca.gov/news.php?id=19160. MMRSA became effective on January 1, 2016. S.B. 643, 2015−2016 Reg. Sess., § 20 (Cal. 2015) (enacted).

[115] *See* CAL. BUS. & PROF. CODE §§ 19331−19333 (West 2016); CAL. HEALTH & SAFETY CODE § 11362.777 (West 2016).

[116] CAL. HEALTH & SAFETY CODE § 11362.777(b) (West 2016).

[117] *See id.* § 11362.777(c).

[118] *See* CAL. BUS. & PROF. CODE § 19316(a), (c) (West 2016).

Thus, MMRSA maintains the status quo in part from the Prevailing Medical Marijuana Laws and will continue to incentivize potentially excessive outdoor cultivation within localities that have the most permissive medical marijuana laws.[119]

Notwithstanding the continued ability for local governments to ban medical marijuana cultivation, an explicit purpose of MMRSA is to address the environmental impacts of medical marijuana cultivation.[120] To do so, MMRSA replicates the regulatory efforts described above in Part II.A by adding section 11362.769 to the Health and Safety Code, which requires:

> State agencies, including, but not limited to, the State Board of Forestry and Fire Protection, the [CDFW], the [California Water Boards], and traditional state law enforcement agencies shall address environmental impacts of medical marijuana cultivation and shall coordinate, when appropriate, with cities and counties and their law enforcement agencies in enforcement efforts.[121]

As indicated above in Part II.A, the California Water Boards and CDFW already initiated actions targeting medical marijuana cultivation under their existing regulatory authority. Therefore, by mentioning "State agencies" in general and specifically mentioning "the State Board of Forestry and Fire Protection," Health and Safety Code section 11362.769 forces additional state agencies into regulatory action against medical marijuana cultivation under their existing authority.

Next, MMRSA expands and facilitates the CDFW & State Water Board Regulatory Strategy discussed above in Part II.A. First, MMRSA implements the CDFW & State Water Board Regulatory Strategy on a permanent and statewide basis.[122] Second, MMRSA requires the seven remaining Regional Water Boards to develop permit programs like the ones developed by the

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[119] *See supra* Parts I, I.C.

[120] *See* Assemb. B. 243, 2015−2016 Reg. Sess., Legis. Counsel's Digest (Cal. 2015) (enacted) ("The bill would also require various state agencies to take specified actions to mitigate the impact that marijuana cultivation has on the environment."); *see also* EDMUND G. BROWN JR., OFFICE OF THE GOVERNOR OF THE STATE OF CAL., SIGNING MESSAGE FOR ASSEMBLY BILL 243 at 1 (Oct. 9, 2015), *available at* https://www.gov.ca.gov/docs/AB_243_Signing_Message.pdf.

[121] CAL. HEALTH & SAFETY CODE § 11362.769 (West 2016).

[122] *See* CAL. WATER CODE § 13276(a) (West 2016); CAL. FISH & GAME § 12029(c) (West 2016).

North Coast and Central Valley Regional Water Boards as part of the CDFW & State Water Board Regulatory Strategy.[123]

Related to the Regional Water Board permit programs, MMRSA requires (1) the CDFW to "adopt regulations to enhance the fees on any" medical cannabis cultivation sites that require remediation under California Fish and Game Code section 1602[124] and (2) the California Department of Pesticide Regulation (hereinafter, the "CDPR") to promulgate regulations in consultation with the California Water Boards on the "application of pesticides or other pest control in connection with the indoor or outdoor cultivation of medical cannabis . . . ."[125] The CDFW & State Water Board Regulatory Strategy's permit programs discussed above in Part II.A require all applicable cultivators (1) to acquire Fish and Game Code section 1602 permits from the CDFW[126] and (2) to follow the CDPR's *Legal Pest Management Practices for Marijuana Growers in California*.[127]

Finally, MMRSA's licensing program requires the CDFA to "promulgate regulations governing the licensing of indoor and outdoor cultivation sites."[128] In developing its licensing regulations, the CDFA must consult with the California Water Boards and CDFW to:

> [E]nsure that individual and cumulative effects of water diversion and discharge associated with [medical marijuana] cultivation do not affect the instream flows needed for fish spawning, migration, and rearing, and the flows needed to maintain natural flow variability.[129]

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[123] CAL. WATER CODE § 13276(b).
[124] CAL. FISH & GAME § 12029(d)).
[125] CAL. BUS. & PROF. CODE § 19332(f) (West 2016).
[126] *Compare* ORDER NO. 2015-0023, *supra* note 96, app. D at 1 *with* ORDER R5-2015-0113, *supra* note 96, at 5.
[127] *Compare* ORDER NO. 2015-0023, *supra* note 96, app. E1 at 1−5 *with* ORDER R5-2015-0113, *supra* note 96, attach. D at 1−5 (both Permit Programs promulgating the CDPR's *Legal Pest Management Practices for Marijuana Growers in California*).
[128] CAL. BUS. & PROF. CODE § 19332(a) (West 2016).
[129] *Id.* § 19332(d).

The CDFW & State Water Board Regulatory Strategy's permit programs discussed above in Part II.A will have existed prior to and independent of the CDFA's cultivation licensing program for at least two years prior to the full expected implementation of MMRSA in 2018.[130] Failure to comply with CDFA's ultimate regulations under MMRSA could result in a cannabis cultivator being denied a state license required to legally operate under MMRSA.[131] Thus, compliance with CDFW & State Water Board Regulatory Strategy's permit programs will likely just be a prerequisite for medical marijuana cultivators seeking a state license from the CDFA under MMRSA. In other words, not only does MMRSA expand and facilitate the CDFW & State Water Board Regulatory Strategy, it incorporates the Strategy into the CDFA's cultivation licensing program.

What is particularly noteworthy about MMRSA from an environmental regulation perspective is its requirement that the CDFA "make available a certified organic designation and organic certification program for medical marijuana . . . ."[132] Unlike the CDFW & State Water Board Regulatory Strategy and the portions of MMRSA discussed thus far—which constitute traditional command and control environmental regulation—"organic" designations and certification programs *arguably* constitute incentive or market-based environmental regulations.[133] "Arguably" is the key word though because organic farming is not necessarily the same as environmentally friendly farming.[134] According to environmental lawyer and law professor William Eubanks, "organic farming on an industrial scale, as many of the largest companies do, presents many of the same ecological problems . . . that plague conventional

[130] *Compare* Part II.A, *supra with* CAL. BUS. & PROF. CODE § 19321(c)) ("[A] facility or entity that is operating in compliance with local zoning ordinances and other state and local requirements on or before January 1, 2018, may continue its operations until its application for licensure is approved or denied pursuant to this chapter.")

[131] CAL. BUS. & PROF. CODE § 19323(b)(1).

[132] *Id.* § 19332.5(a).

[133] *See* O'HARE ET AL., *supra* note 27, at 23.

[134] *See* MARY JOE ANGELO ET AL., *supra* note 11, at 230 ("[T]here is still consumer confusion on the meaning of the term 'organic.'").

farming on an industrial scale, therefore potentially undermining the value and purpose of having an organic label in the first place."[135] As a result, medical marijuana certified "organic" under MMRSA may still have negative environmental impacts and consumers may not even realize it.

C. *Proposition 19 and Future Legalization Initiatives*

Taken together, the CDFW & State Water Board Regulatory Strategy and MMRSA are important in that they shift the focus on marijuana cultivation from prohibition to regulation and specifically focus on the environmental impacts of marijuana cultivation in doing so. As a result, under the CDFW & State Water Board Regulatory Strategy and MMRSA there is likely to be mitigation of the environmental impacts described in Part I. However, neither the CDFW & State Water Board Regulatory Strategy nor MMRSA addresses the key issue likely to have the greatest positive impact on marijuana cultivation and the environment: full legalization of marijuana for recreational purposes. Full legalization would greatly eliminate the perverse incentives marijuana cultivators have to pursue strategies that are particularly harmful to the environment. Given that multiple groups are preparing for a marijuana legalization voter initiative in 2016,[136] the best hope for full legalization of marijuana in California (and its environmental benefits) is through a voter initiative on the 2016 ballot.

Before turning to the proposed initiatives for 2016, a brief discussion of Proposition 19, proposed in 2010, is appropriate. Proposition 19, the Regulate, Control and Tax Cannabis Act, was a voter initiative put on the ballot in 2010 and, "[i]f passed, . . . would have legalized the possession, consumption, and cultivation of marijuana for people twenty-one and older."[137]

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[135] *Id.* at 268 (citations omitted).

[136] David Downs, *California marijuana legalization already a four-way tussle*, SMELL THE TRUTH (Mar. 11, 2015, 10:45 AM), http://blog.sfgate.com/smellthetruth/2015/03/11/california-marijuana-legalization-already-a-four-way-tussle/.

[137] Kelly, *supra* note 24, at 99.

However, Proposition 19 did not ultimately pass, with only 46.5 percent voting in favor.[138] The opponents of Proposition 19 successfully "argued that the law itself was poorly worded and therefore voters should vote down the law regardless of whether they thought marijuana should be legalized."[139] When viewed through the lens of environmental regulation, the opponents' claim holds water.

Unlike its predecessors, the Prevailing Medical Marijuana Laws, Proposition 19 did directly address the issue of environmental regulation.[140] However, Proposition 19 continued the folly of the judicial gloss on the Prevailing Medical Marijuana Laws—a regulatory regime completely reliant on delegation to local governments. To illustrate, Proposition 19 would have added section 11301 to the Health and Safety Code which would have provided:

> Notwithstanding any other provision of state or local law, a local government may adopt ordinances, regulations, or other acts having the force of law to control, license, regulate, permit, or otherwise authorize, with conditions, the following:
> . . .
> (i) Appropriate environmental and public health controls to ensure that any licensed premises minimizes any harm to the environment, adjoining and nearby landowners, and persons passing by.[141]

In other words, although Proposition 19 would have eliminated the prohibition on recreational marijuana cultivation, it would not have eliminated the ability of local governments to ban marijuana cultivation, thereby pushing the cultivation, and its resulting environmental impacts, disproportionately into local governments with more permissive regulatory regimes.

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[138] *Id.* at 99−100.

[139] *See* Kenneth Falcon, *A Lesson in Legalization: Successes and Failures of California's Proposition 19*, 9 GEO. J.L. & PUB. POL'Y 463, 475 (2011).

[140] *See* THE REGULATE, CONTROL AND TAX CANNABIS ACT OF 2010, PROPOSED INITIATIVE MEASURE 09-0024 §§ 1−3 (Aug. 4, 2009) [hereinafter PROPOSITION 19], *available at* http://cdn.sos.ca.gov/vig2010/general/pdf/english/text-proposedlaws.pdf#prop19.

[141] *Id.* § 3.

In the aftermath of Proposition 19, the marijuana community and industry are divided on how to proceed with legalization.[142] As a result, there may be multiple marijuana legalization initiatives on the 2016 ballot.[143] Nevertheless, of the dozen or so marijuana legalization initiatives filed with the California Attorney General's Office, [144] as of December 2015,[145] only three initiatives have *any*[146] political viability to actually make the 2016 ballot: (1) the California Cannabis Hemp Initiative 2016 (hereinafter, the "Jack Herer Initiative"); (2) the Control, Regulate and Tax Adult Use of Marijuana Act (hereinafter, the "Sean Parker Initiative"); and (3) the Marijuana Control, Legalization and Revenue Act of 2016 (hereinafter, the "MCLR Initiative"). In the following subsections, this comment will analyze each of these initiatives to determine how they respectively address the issue of environmental regulation and whether the drafters learned lessons from the shortcomings of Proposition 19.[147]

### 1. The California Cannabis Hemp Initiative 2016, a.k.a. the Jack Herer Initiative

The Jack Herer Initiative does not directly address the environmental regulation issue aside from its statement of purpose, where the initiative declares:

> This Act is an exercise of the police powers of the State for the *protection of the safety, welfare, health, and peace of the people and the environment of the State*, to protect the industrial and medicinal uses of cannabis hemp, to eliminate the unlicensed and unlawful cultivation, selling, and dispensing of cannabis hemp; and to

[142] *See* Downs, *supra* note 136.

[143] *See id.*

[144] *See Initiatives—Active Measures*, CAL. DEP'T OF JUSTICE, OFFICE OF THE ATT'Y GEN., https://www.oag.ca.gov/initiatives/active-measures (last visited Jan. 1, 2016).

[145] *See* David Downs, *California Legalization 2016 Heats Up: Major Endorsement From Emerald Cup's Tim Blake*, LEGALIZATION NATION (Dec. 14, 2015), http://www.eastbayexpress.com/LegalizationNation/archives/2015/12/14/california-legalization-2016-heats-up-major-endorsement-from-emerald-cups-tim-blake.

[146] The political positions of the respective initiatives and the wherewithal (finances, organization, etc.) of the respective sponsors to ultimately make the 2016 ballot is well beyond the scope of this comment.

[147] The purpose of the forthcoming analysis is not to endorse one particular initiative over the other but rather to focus on the narrow issue environmental regulation and determine what kind of regulatory regime each initiative would create.

> encourage temperance in the consumption of cannabis hemp euphoric products.[148]

Aside from the statement of purpose, the initiative is void of direct language regarding environmental regulation.[149] However, the initiative does take steps to eliminate the ability of local governments to ban marijuana cultivation by expressly requiring the repeal of "any and all existing state and local statutory laws and regulations that conflict with the provisions of this Act."[150] Presumably, this language would prevent local governments from banning marijuana cultivation within their limits. The Jack Herer Initiative then requires the California Legislature "to enact legislation using reasonable standards which are compatible with the provisions of this Act."[151] The combination of these two provisions presumably would lead to uniform statewide environmental regulation, assuming the California Legislature included environmental regulation in the mandated legislation. However, given the lack of direct language on the subject, it can be argued that the California Legislature would not be required to enact environmental regulations.

Another potential issue the Jack Herer Initiative presents for environmental regulation is its provisions on personal marijuana use. The Jack Herer Initiative prohibits requiring a permit, license, or tax for the cultivation of marijuana for personal use.[152] The Jack Herer Initiative then goes on to create a statutory presumption that ninety-nine mature plants *and* twelve pounds of usable marijuana or less is for personal use rather than for commercial purposes.[153] However, the ninety-nine-plant limit is far in excess of the plant limits within localities that are already

[148] CALIFORNIA CANNABIS HEMP INITIATIVE 2016, CALIFORNIA CANNABIS HEMP ACT OF 2016 § VII, http://www.cchi2016.org/fulltext.html (last visited Jan. 2, 2016) (emphasis added).
[149] *Id.* §§ I–VII.
[150] *Id.* § II(a).
[151] *Id.* § III(a).
[152] *Id.* § I(e)(1) ("No permit, license, or tax shall be required for the non-commercial cultivation, transportation, distribution, or consumption of cannabis hemp.").
[153] *Id.* § I(f) (emphasis added).

experiencing the worst environmental impacts of medical marijuana cultivation.[154] Therefore, by hampering the use of permitting, licensing, or taxation on marijuana gardens with less than ninety-nine plants, the Jack Herer Initiative strips would-be regulators of important tools for controlling and limiting the environmental impacts of marijuana cultivation.[155]

### 2. The Control, Regulate and Tax Adult Use of Marijuana Act, a.k.a. the Sean Parker Initiative

Like the Jack Herer Initiative, the Sean Parker Initiative includes environmental aspirations in its declarations of purpose.[156] However, unlike the Jack Herer Initiative, the Sean Parker Initiative mandates a specific regulatory regime that includes regulations that directly address the environmental impacts of marijuana cultivation. The Sean Parker Initiative addresses the environmental impacts of marijuana cultivation in the same manner as MMRSA, except applied to cultivation of marijuana for recreational purposes. To begin, the Sean Parker Initiative also replicates the regulatory efforts described above in Part II.A by forcing state agencies into regulatory action against recreational marijuana cultivation under their existing authority.[157] Next, the Sean Parker Initiative expands the CDFW & State Water Board Regulatory Strategy by requiring (1) the CDFW & State Water Board Regulatory Strategy's permit programs and the seven additional Regional Water Board permit programs to be developed under MMRSA to be

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[154] *See Local Medical Marijuana Cultivation & Possession Guidelines in California*, CAL. NORML (Dec. 30, 2015), http://www.canorml.org/medical-marijuana/local-growing-limits-in-California ("The maximum allowable indoor or outdoor garden in Mendocino county is now 25 plants per parcel".); Kelly, *supra* note 24, at 97 ("Mendocino County has suffered some of the worst environmental consequences of marijuana cultivation" due to "[a] combination of permissive local laws, rich soil, compatible temperature, and huge forests used for camouflage".).

[155] *See supra* Part I.B (discussing the use electricity taxes to offset the impact of carbon emissions from marijuana cultivation); Part II.A (discussing the development of a permitting program by the California Water Boards).

[156] *See* OLSON HAGEL & FISHBURN LLP, THE CONTROL, REGULATE AND TAX ADULT USE OF MARIJUANA ACT §§ 2−3, https://www.oag.ca.gov/system/files/initiatives/pdfs/15-0103%20%28Marijuana%29_1.pdf? (last visited Jan. 2, 2016).

[157] *Compare id.* § 6, proposed text to be added at CAL. BUS. & PROF. CODE § 26066 *with* CAL. HEALTH & SAFETY CODE § 11362.769 (West 2016).

applied to recreational marijuana cultivation[158] and (2) the CDPR's *Legal Pest Management Practices for Marijuana Growers in California* to be applied to recreational marijuana cultivation.[159] Moreover, similar to MMRSA, the Sean Parker Initiative incorporates the CDFW & State Water Board Regulatory Strategy into a cultivation licensing program for recreational marijuana administered by the CDFA,[160] except that the Sean Parker Initiative is more explicit that compliance with CDFW & State Water Board Regulatory Strategy's permit programs[161] is a prerequisite for recreational marijuana cultivators seeking a license from the CDFA.[162] Finally, as MMRSA did with medical marijuana, the Sean Parker Initiative requires the CDFA to make a certified organic designation and organic certification program for available for recreational marijuana.[163]

In addition to these similarities, the Sean Parker Initiative goes above and beyond MMRSA in terms of facilitating the CDFW & State Water Board Regulatory Strategy. First, the Sean Parker Initiative increases the potential sources of funding for the CDFW & State Water Board Regulatory Strategy by (1) explicitly allowing the California Water Boards and CDFW to establish fees to cover the cost of implementing the CDFW & State Water Board Regulatory Strategy[164] and (2) specifically allocating revenues from marijuana taxes to an "Environmental Restoration and Protection Account" from which funds can be disbursed towards the CDFW & State Water Board

[158] *Compare* OLSON HAGEL & FISHBURN LLP *supra* note 155, § 6, proposed text to be added at CAL. WATER. CODE § 13276(b) *with* CAL. WATER. CODE § 13276(b) (West 2016).

[159] *Compare* OLSON HAGEL & FISHBURN LLP *supra* note 155, § 6, proposed text to be added at CAL. BUS. & PROF. CODE § 26060(e) *with* CAL. BUS. & PROF. CODE § 19332(f) (West 2016). *See also supra* Part II.B.

[160] *Compare* OLSON HAGEL & FISHBURN LLP *supra* note 155, § 6, proposed text to be added at CAL. BUS. & PROF. CODE § 26060(a)−(d) *with* CAL. BUS. & PROF. CODE § 19332(d) (West 2016).

[161] And the seven additional Regional Water Board permit programs to be developed under MMRSA.

[162] *See* OLSON HAGEL & FISHBURN LLP *supra* note 155, § 2.F; *id.* § 6, proposed text to be added at CAL. BUS. & PROF. CODE §§ 26051(a)(6), 26056(c)(6), 26056.5, 26057(b)(6)−(7), 26060(c).

[163] *Compare* OLSON HAGEL & FISHBURN LLP *supra* note 155, § 6, proposed text to be added at CAL. BUS. & PROF. CODE § 26062 *with* CAL. BUS. & PROF. CODE § § 19332.5(a) (West 2016).

[164] *See* OLSON HAGEL & FISHBURN LLP *supra* note 155, § 6, proposed text to be added at CAL. BUS. & PROF. CODE § 26181.

Regulatory Strategy.[165] Second, the Sean Parker Initiative makes violations of California Water Code and Fish and Game Code provisions that will inevitably be enforced as part of the CDFW & State Water Board Regulatory Strategy punishable as felonies under the California Health and Safety Code.[166]

Lastly, on the issue of the ability of local governments to ban marijuana cultivation, the Sean Parker Initiative allows local governments to ban recreational marijuana cultivation.[167] In other words, like MMRSA but for recreational marijuana, the Sean Parker Initiative merely sets minimum standards upon which local governments can add more stringent regulatory requirements up to and including complete bans.[168] Thus, the Sean Parker Initiative extends the status quo from the Prevailing Medical Marijuana Laws to recreational marijuana and would continue to incentivize excessive outdoor cultivation within localities that have the more permissive cultivation laws.[169]

### 3. The Marijuana Control, Legalization and Revenue Act of 2016, a.k.a. the MCLR Initiative

At a high level the MCLR Initiative is similar to the Jack Herer Initiative. Like the Jack Herer Initiative, the MCLR Initiative does not directly address the environmental impacts of marijuana cultivation but rather delegates regulatory authority over recreational marijuana cultivation to the California Legislature.[170] Given the lack of direct language on the subject, it can of course be argued that the California Legislature would not be required enact environmental

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[165] *See id.* § 7, proposed text to be added at CAL. REV. & TAX. CODE § 34019(f)(2)(C).
[166] *See id.* § 8, proposed text to be added at CAL. HEALTH & SAFETY CODE § 11358(d)(3).
[167] *See id.* § 6, proposed text to be added at CAL. BUS. & PROF. CODE § 26200.
[168] *Compare id.* § 6, proposed text to be added at CAL. BUS. & PROF. CODE § 26201 *with* CAL. BUS. & PROF. CODE § 19316(a), (c) (West 2016).
[169] *See* Parts I, I.C, *supra*.
[170] AMERICANS FOR POLICY REFORM, THE MARIJUANA CONTROL, LEGALIZATION AND REVENUE ACT OF 2016 VERSION 7.0 § 3, proposed text to be added at CAL. BUS. & PROF. CODE § 27400, https://www.oag.ca.gov/system/files/initiatives/pdfs/15-0120%20%28Marijuana%20V7%29.pdf? (last visited Jan. 2, 2016).

regulations. However, the MCLR Initiative's delegation of authority to the Legislature is much broader than the Jack Herer Initiative. Unlike the Jack Herer Initiative, the MCLR Initiative does not include a presumption of personal use or a restriction on the means available for regulating the cultivation of recreational marijuana for personal purposes.[171] Thus, the MCLR Initiative does not strip important tools for controlling and limiting the environmental impacts of marijuana cultivation from would-be regulators.

Notwithstanding the broad delegation of authority, the MCLR Initiative would not lead to uniform, statewide environmental regulation as the MCLR Initiative allows local governments to ban recreational marijuana cultivation.[172] However, unlike MMRSA and the Sean Parker Initiative (which both also allow local cultivation bans), the MCLR Initiative places a procedural restriction on the authority by requiring any marijuana cultivation ban to be approved by local voters via an initiative or referendum.[173] Thus, the MCLR Initiative only partially extends the status quo from the Prevailing Medical Marijuana Laws but would still likely incentivize excessive outdoor cultivation within localities that have the more permissive cultivation laws.[174]

## III. LOTS OF STICKS TO CHEW ON BUT NOT MANY CARROTS TO EAT

Most notably, the regulatory responses discussed above in Part II all focus on heavy-handed, command and control regulation or defer to a regulatory actor also likely to pursue heavy-handed, command and control regulation. The CDFW & State Water Board Regulatory Strategy with its creation of permit programs for marijuana cultivation and use inspections, enforcement, and outreach to complement the permit programs is a paradigmatic example of command and

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[171] *Compare* AMERICANS FOR POLICY REFORM *supra* note 169, §§ 1−9 *with* CALIFORNIA CANNABIS HEMP INITIATIVE 2016, *supra* note 148, § I(e)−(f).

[172] *See* AMERICANS FOR POLICY REFORM *supra* note 169, § 6, proposed text to be added at CAL. BUS. & PROF. CODE § 27600.

[173] *See id.*

[174] *See supra* Parts I, I.C.

control environmental regulation.[175] All subsequent responses by the California Legislature incorporate the CDFW & State Water Board Regulatory Strategy. MMRSA (the Legislature's recently enacted regulatory regime for medical marijuana) and the Sean Parker Initiative (one of the possible 2016 initiatives to regulate recreational marijuana) explicitly incorporate the CDFW & State Water Board Regulatory Strategy.[176] Although the Jack Herer Initiative and the MCLR Initiative (the other two possible 2016 initiatives to regulate recreational marijuana) do not even directly address the environmental impacts of marijuana cultivation,[177] both implicitly (and perhaps unintentionally) incorporate the CDFW & State Water Board Regulatory Strategy.

Rather than directly address environmental regulations for recreational marijuana cultivation, both the Jack Herer Initiative and the MCLR Initiative delegate regulatory authority over recreational marijuana cultivation to the California Legislature.[178] Given each initiative's lack of direct language on environmental regulation, it can be argued that the Legislature would not be required enact environmental regulations. However, the more likely result would be for the Legislature to incorporate the CDFW & State Water Board Regulatory Strategy. To illustrate, when the Legislature finally decided to regulate medical marijuana via MMRSA it incorporated the CDFW & State Water Board Regulatory Strategy.[179] When forced to regulate recreational marijuana under either the Jack Herer Initiative or the MCLR Initiative, why would the Legislature not just reenact the regulatory models developed in MMRSA except reapplied to recreational marijuana?

[175] *See supra* Part II.A.
[176] *See supra* Parts II.B, II.C.2.
[177] *See supra* Parts II.C.1, II.C.3.
[178] *See id.*
[179] *See supra* Part II.B.

Stated differently, assuming that one or even all of the 2016 initiatives discussed in this comment succeed, the likely result is the adoption of the California Water Boards & CDFW Regulatory Strategy and MMRSA for the environmental regulation of recreational marijuana cultivation. This presents a missed opportunity for the 2016 legalization initiatives—the opportunity to leverage incentive or market-based environmental regulations. Incentive or market-based environmental regulations "give[] the producer consequential encouragement to provide more of a desired outcome but without (in principle) a minimum level of achievement."[180] Policy analysts generally favor incentive or market-based environmental regulations over traditional command and control environmental regulation because incentive or market-based regulations "preserve incentives for innovation while focusing on the specific types of benefit the regulatory program is intended to obtain."[181] This comment has mentioned two incentive or market-based environmental regulations related to marijuana cultivation: (1) Arcata's Excessive Residential Electricity Users Tax[182] and (2) organic labeling and certification programs.[183] Arcata's Excessive Residential Electricity Users Tax fits within the incentive or market-based environmental regulation framework because it "increase[s] the producer tax on indoor marijuana by an amount that reflect[s] (approximately) its respective carbon footprint"[184] but does not prohibit or directly regulate indoor cultivation. Although not a purely an environmental regulation as constituted,[185] MMRSA and the Sean Parker Initiative's organic labeling and certification programs fit within the

[180] O'HARE ET AL., *supra* note 27, at 23.
[181] *Id.*
[182] *See supra* Part I.B.
[183] *See supra* Parts II.B, II.C.2.
[184] *See* O'HARE ET AL., *supra* note 27, at 23 (In describing a proposed tax for indoor marijuana in Washington O'Hare et al. indicate: "This amount would not ruin the competitiveness of indoor production but would provide a gentle incentive and have considerable symbolic value.").
[185] *See* MARY JOE ANGELO ET AL., *supra* note 11, at 301 ("Eco-labeling," as distinguished from "organic labeling," is a "more ambitious informational labeling" regime that involves "product labels evaluating the ecological and carbon footprint of products including foods . . . .").

incentive or market-based environmental regulation framework because they do not mandate that marijuana cultivators utilize particular practices but would allow those cultivators that do to receive potentially "higher retail price[s] than conventional[ly]" grown marijuana.[186] If remodeled as an eco-labeling program, MMRSA and the Sean Parker Initiative's designation and organic certification programs "could provide consumers with information about the environmental costs of [their marijuana consumption] choices, resulting in changes in consumer preferences and buying practices"[187] towards marijuana cultivated in a more environmentally sustainable manner.

Incentive or market-based environmental regulations could be vital to the campaigns for the 2016 initiatives and for their successful passage. One of the explanations for Proposition 19's failure to pass was opposition from an arguably unexpected set of stakeholders—the current marijuana cultivators of Humboldt, Mendocino, and Trinity counties who believed Proposition 19's cultivation rules would shut them out of the industry.[188] The creation of a regulatory regime for recreational marijuana that incorporates the CDFW & State Water Board Regulatory Strategy could risk re-alienating the current marijuana cultivators of Humboldt, Mendocino, and Trinity counties because compliance with heavy-handed command and control regulations could push current cultivators out of the market.[189] Ultimately then, incentive or market-based environmental regulations could serve as a compromise position allowing legalization groups to emphasize the environmental regulation of marijuana cultivation to the general electorate, while not alienating

[186] *Id.* at 228.

[187] *Id.* at 301.

[188] *See* Steve Bloom, *Why Northern California's Pot Growers Said No to Prop 19*, HUFFPOST LOS ANGELES (May 25, 2011, 6:10 AM), http://www.huffingtonpost.com/steve-bloom/why-northern-californias-_b_779415.html. *See also* Falcon, *supra* note 113, at 482−83.

[189] *See* Lisa Leff, *Despite nebulous legal status, Emerald Triangle pot growers hiring lobbyists*, THE PRESS DEMOCRAT (Apr. 14, 2015, 2:04 PM), http://www.pressdemocrat.com/home/3801617-181/despite-nebulous-legal-status-emerald?page=0 ("Allen said. 'If regulation does not include them, they will be forced between not being able to afford licenses and not having enough time to transition or continuing to operate in a gray area or worse yet, being forced into the black market.'").

the current marijuana growers of Humboldt, Mendocino, and Trinity counties.[190] However, if the legalization groups supporting the 2016 initiatives seek to adopt incentive or market-based environmental regulations, they should specifically enact them in their respective initiatives rather the delegating broad authority to unpredictable regulators.

## IV. CONCLUSION

This comment highlights the adverse environmental consequences of California's prohibition on marijuana cultivation and the strong possibility that the regulation and full legalization of marijuana could greatly mitigate those adverse environmental consequences. At this point, others are starting to recognize the adverse consequences the absolute prohibition of marijuana has on the environment and there are currently multiple responses from the full swath of policymaking bodies in California to regulate or legalize the cultivation of marijuana. The most important responses from an environmental perspective are the proposed 2016 voter initiatives because they provide the best hope for full legalization of marijuana and the environmental benefits likely to come with legalization. However, all the politically viable 2016 voter initiatives incorporate the heavy-handed, command and control CDFW & State Water Board Regulatory Strategy endorsed by the California Legislature through the passage of MMRSA. Because of the need to strike a balance between the interests of the current cultivators of marijuana (who do not want to be driven out of business from over-regulation) and the general electorate (who want to see the marijuana industry brought under control), this comment advocates that the 2016 voter initiatives should explicitly advocate for incentive or market-based environmental regulations.

[190] *See id.* (describing efforts the current marijuana growers of Humboldt, Mendocino and Trinity counties "to make their voices heard at the Capitol now that groundwork is being laid to legalize pot for recreational use in [California]" and highlighting their position "that any licensing system should employ a tiered approach that leaves room for small 'craft cultivators'").

This comment's ultimate recommendation inevitably opens up another question: What specific incentive or market-based environmental regulations should be pursued in the 2016 voter initiatives and beyond? This comment concluded by mentioning the need for legalization groups to consider incentive or market-based environmental regulations such as Arcata's Excessive Residential Electricity Users Tax or an eco-labeling version of MMRSA and the Sean Parker Initiative's organic labeling and certification programs. Besides the incentive or market-based environmental regulations touched upon briefly in this comment (taxing pollution-generating activities and labeling regulations), there are others.[191] Additional research should be done in these areas, particularly if legalization groups heed this comment's call and draft initiatives that specifically include incentive or market-based environmental regulations. Of particular importance to the further research, incentive or market-based environmental regulation is empirically intensive because of the need to set and adjust the correct "price" of the incentive. For example, O'Hare et al. conducted a detailed empirical study of the specific conditions in Washington to determine an accurate "price" to tax the climate effects of indoor marijuana cultivation.[192] Something similar would have to be done for California (or even down to specific localities in California) if one of the 2016 initiatives, for instance, decided to propose a carbon tax on indoor marijuana cultivation. However, putting the effort into research to develop well-tailored incentive or market-based environmental regulations could be a better use of resources than advocating for an initiative that alienates key stakeholders. That effort could be the difference between passing a legalization initiative that finally addresses the environmental impacts of marijuana cultivation and allowing those environmental impacts to continue to linger.

[191] For example, there are subsidizing environmentally friendly cultivation practices, paying farmers for ecosystem services, and transferable development rights. *See* MARY JOE ANGELO ET AL., *supra* note 11, at 241−44.

[192] *See* O'HARE ET AL., *supra* note 27, at 24 ("This additional climate fee would amount to approximately a twenty percent surcharge on electricity use.").

APPENDIX A.
REGULATORY CHARACTERISTICS OF LOCAL GOVERNMENT MEDICAL MARIJUANA ORDINANCES[194]
AS OF MARCH 25, 2015[195]

| Local Government | Has Environmental Regulation Provisions (Other than Bans) | Bans All Cultivation (Outright or Effectively) | Bans Outdoor Cultivation (or Requires Cultivation in Enclosed Structure) | Allows Indoor Cultivation Only in Accessory Structures | Contains Planting Area Limitations | Only Allows Twelve Plants or Fewer (Either per Patient or Parcel) | Permits More than Twelve Plants (per Parcel) |
|---|---|---|---|---|---|---|---|
| Amador | | | | | | X | |
| Anderson | | | X | X | X | | |
| Avenal | | X | | | | | |
| Arcata | X | | | | X | | |
| Beaumont | | X | | | | | |
| Berkeley | | | | | | X | |
| Biggs | | | X | | | | |
| Butte County | | | | | X | | |
| California City | | X | | | | | |
| Capitola | | | X | | X | | |
| Chico | | | X | | X | | |
| Chowchilla | | | X | | X | | |
| Citrus Heights | | | X | | | | |
| Clearlake | | | | | X | | |
| Clovis | | | X | | X | | |

[194] Data compiled by Damian A. Martin from the following source: *Local Medical Marijuana Cultivation & Possession Guidelines in California*, *supra* note 154.

[195] The below table is designed to be illustrative rather than exhaustive. To begin, the State of California has over 500 general purpose local governments. *Number of Local Governments by State*, GOVERNING, http://www.governing.com/gov-data/number-of-governments-by-state.html (last visited Mar. 27, 2015). Furthermore, local government regulation is easily the most dynamic area of California medical marijuana law. In other words, local ordinances are continually enacted, challenged, and revised. To witness the dynamic nature of local government regulation of medical marijuana cultivation one need only follow the Twitter account of California NORML—@CaliforniaNORML. *See Tweets*, CAL. NORML, http://www.canorml.org/ (last visited Mar. 27, 2015).

| Local Government | Has Environmental Regulation Provisions (Other than Bans) | Bans All Cultivation (Outright or Effectively) | Bans Outdoor Cultivation (or Requires Cultivation in Enclosed Structure) | Allows Indoor Cultivation Only in Accessory Structures | Contains Planting Area Limitations | Only Allows Twelve Plants or Fewer (Either per Patient or Parcel) | Permits More than Twelve Plants (per Parcel) |
|---|---|---|---|---|---|---|---|
| Colton | | X | | | | | |
| Colusa | | X | | | | | |
| Concord | | | X | | | | |
| Corcoran | | X | | | | | |
| Corning | | | X | X | | | |
| El Dorado County | | | | | X | | |
| Elk Grove | | | X | | X | | |
| Eureka | | | X | | X | | |
| Farmersville | | X | | | | | |
| Ft. Bragg | | | | | X | | |
| Fremont | | X | | | | | |
| Fresno | | X | | | | | |
| Fresno County | | X | | | | | |
| Galt | | X | | | | | |
| Glenn County | | | | | X | | |
| Gridley | | | X | | | | |
| Gustine | | | X | | X | | |
| Hanford | | X | | | | | |
| Healdsburg | | | | | | X | |
| Humboldt County | | | | | X | | |
| Imperial Beach | | X | | | | | |
| Kern County | | | | | | X | |
| Kings County | | | X | | | | |

| Local Government | Has Environmental Regulation Provisions (Other than Bans) | Bans All Cultivation (Outright or Effectively) | Bans Outdoor Cultivation (or Requires Cultivation in Enclosed Structure) | Allows Indoor Cultivation Only in Accessory Structures | Contains Planting Area Limitations | Only Allows Twelve Plants or Fewer (Either per Patient or Parcel) | Permits More than Twelve Plants (per Parcel) |
|---|---|---|---|---|---|---|---|
| Lake County | | | | | X | X | X |
| Lakeport | | | X | | X | | |
| Lassen | | X | | | | | |
| Live Oak | | X | | | | | |
| Lodi | | | X | | | | |
| Madera County | | X | | | | | |
| Manteca | | | X | | | | |
| Mariposa County | | | | | | X | |
| Martinez | | | X | | | X | |
| Mendocino County | | | | | X | | X |
| Merced | | | | | | X | |
| Modoc County | | | | | | X | |
| Moraga | | | X | | | | |
| Nevada County | | | | | X | | |
| Oakland | | | | | X | | X |
| Orland | | | X | | X | | |
| Paradise | | | | | X | | |
| Placer County | | X | | | | | |
| Porterville | | | | | | | X |
| Rancho Cordova | | | X | | | | |
| Redding | | | | | X | | |
| Ripon | | | X | | | | X |

| Local Government | Has Environmental Regulation Provisions (Other than Bans) | Bans All Cultivation (Outright or Effectively) | Bans Outdoor Cultivation (or Requires Cultivation in Enclosed Structure) | Allows Indoor Cultivation Only in Accessory Structures | Contains Planting Area Limitations | Only Allows Twelve Plants or Fewer (Either per Patient or Parcel) | Permits More than Twelve Plants (per Parcel) |
|---|---|---|---|---|---|---|---|
| Riverside County | | X | | | | | |
| Rocklin | | | X | | X | | |
| Roseville | | | X | | | | |
| Sacramento | | | X | | X | | |
| Sacramento County | | | X | | | X | |
| San Bernardino County | | | X | | | | |
| San Carlos | | | X | | | | |
| San Diego | | | | | | | X |
| San Francisco | | | | | X | | X |
| San Mateo | | | X | | | | |
| San Mateo County | | | X | | | | |
| San Pablo | | X | | | | | |
| Santa Cruz County | | | X | | X | | |
| Sebastopol | | | | | X | | X |
| Selma | | | X | | X | | |
| Shasta County | | | X | X | | | |
| Shasta Lake | | | | X | X | | |
| Siskiyou County | | | | | | X | |
| Sonoma County | | | | | X | | X |
| St. Helena | | | X | | | | |

| Local Government | Has Environmental Regulation Provisions (Other than Bans) | Bans All Cultivation (Outright or Effectively) | Bans Outdoor Cultivation (or Requires Cultivation in Enclosed Structure) | Allows Indoor Cultivation Only in Accessory Structures | Contains Planting Area Limitations | Only Allows Twelve Plants or Fewer (Either per Patient or Parcel) | Permits More than Twelve Plants (per Parcel) |
|---|---|---|---|---|---|---|---|
| Sutter County | | | X | | | | |
| South Lake Tahoe | | | X | | X | | |
| Tehama County | | | X | | | | |
| Tracy | | X | | | | | |
| Trinity County | | | | | X | X | X |
| Tulare County | | | X | | | X | X |
| Visalia | | | X | | X | | |
| West Sacramento | | | X | | | | |
| Willits | | | X | | | | |
| Woodland | | | X | | | X | X |
| Yuba | | | X | | X | | |
| Yuba County | | | X | X | | X | |

# *BEE* AWARE OF PESTICIDES: IS THE LEGAL SYSTEM PROTECTING OUR POLLINATORS?

*Justine Coleman*

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INTRODUCTION

> "Remove the bee from the earth and at the same stroke you remove at least one hundred thousand plants that will not survive." - Albert Einstein[1]

Bees are the most important pollinators of virtually all fruit, vegetables and many other fodder plants and crops, as well as of numerous wild and field plants. In North America, honey bees pollinate nearly ninety-five kinds of fruits as well as crops like soybeans.[2] The United Nations Food and Agriculture Organization (FAO) estimates that out of some 100 crop species which provide ninety percent of food worldwide, seventy-one of these are bee-pollinated.[3] In the year 2000, the estimated value of crops in the United States pollinated by bees was 14.6 billion dollars.[4] According to research done by German and French universities, bees' disappearance would cause 380 billion dollars in damage to the world, not counting bees' contribution to biodiversity on the planet.[5]

In recent years many countries observed the phenomenon of the mass death and disappearance of bees.[6] While some level of disappearances have occurred throughout history, the term "colony collapse disorder" (CCD) was first used by scientists to describe a drastic rise in the number of mysterious deaths of honey bee colonies in North America in late 2006.[7] European beekeepers observed similar phenomena in Belgium, France, the Netherlands, Greece, Italy, Portugal, and Spain, and initial reports have also come in from Switzerland and Germany, while the Northern Ireland

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[1] Ernest A. Fortin, *Comments From Quebec*, 49 CANADIAN BEE JOURNAL 13 (January 1941).
[2] Erik Stokstad, The Case of the Empty Hives, 316 SCIENCE 970-72, (May 18, 2007), *available at* http://www.unep.org/dewa/Portals/67/pdf/Global_Bee_Colony_Disorder_and_Threats_insect_pollinators.pdf
[3] *Protecting the Pollinators*, FOOD AND AGRICULTURE ORGANIZATION OF THE U.N. (Dec. 2005), www.fao.org/ag/magazine/0512sp1.htm.
[4] Morse R.A, Calderone N.W, *The Value of Honey Bees as Pollinators of U.S. Crops in 2000*, Cornell University, Ithaca, New York (2000).
[5] *Consequences for the Mankind*, WORLD SAVE BEE FUND, http://save-bee.com/en/ruin-disappearance/consequences/.
[6] "*Mass death of bees*" *Phenomenon*, WORLD SAVE BEE FUND, http://save-bee.com/en/ruin-disappearance/mass-ruin/phenomenon.php.
[7] Renee Johnson, Cong. Research Serv., RL33938, *Honey Bee Colony Collapse Disorder*, at Summary (2010), available at http:// www.fas.org/sgp/crs/misc/RL33938.pdf.; *see also* "*Mass death of bees*" *Phenomenon*, WORLD SAVE BEE FUND, http://save-bee.com/en/ruin-disappearance/mass-ruin/phenomenon.php.

Assembly received reports of a decline greater than fifty percent there.[8] With the average hive size remaining relatively constant, today there are about 2.3 million managed bee colonies in the United States, down from nearly 6 million hives in the 1940s.[9]

Scientists have found several factors that can contribute to CCD, including pesticides, parasites, pathogens and stress.[10] However, pesticides in particular are consistently linked to pollinator declines.[11] Considering all possible factors, since humans produce and regulate the use of pesticides, this factor should be one of the easiest for us to control. In this paper, I argue that banning the use of neonicotinoids will be the most efficient method of curbing the death of our bees.

Professor Einstein once calculated that if all bees disappeared off the earth, four years later all humans would disappear as well.[12] Whether Einstein was correct or not, the serious consequences and difficulty we would face in the absence of bees are not denied. Despite grave consequences associated with CCD and the ample scientific data linking pesticide use to bee deaths, the United States currently lacks sufficient regulation or legislation to protect our bees from pesticide use.

Pollinator decline has forced farmers in southwest China to hand-pollinate their trees by carrying pots of pollen and paintbrushes to individually pollinate every flower.[13] For some high-value crops, this seems possible; however, there are not enough humans in the world to pollinate all of our

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[8] *Id.*

[9] Jeffery S. Pettis & Keith S. Delaplane, *Coordinated Responses to Honey Bee Decline in the USA*, 41 APIDOLOGIE 256, 256 (2010), *available at* http://www.apidologie.org/articles/apido/pdf/2010/03/m09140.pdf.

[10] CCD Steering Comm., U.S. Dep't of Agric., *Colony Collapse Disorder Progress Report*, at Executive Summary (2010), *available at* http://www.ars.usda.gov/is/br/ccd/ccdprogressreport2010.pdf.

[11] *What the Science Shows*, BEYOND PESTICIDES, http://www.beyondpesticides.org/pollinators/research.php#BeeImpacts (last updated Fed. 27, 2015).

[12] G.V. Poulton, *Which Queens are the Best?*, 20 THE IRISH BEEKEEPER: AN BEACHAIRE, April 1966, at 74 (quoting "Abeilles et fleurs", June 1965).

[13] Dave Goulson, *Decline of Bees Forces China's Apple Farmers to Pollinate by Hand*, CHINADIALOGUE (Feb. 10, 2012), https://www.chinadialogue.net/article/show/single/en/5193-Decline-of-bees-forces-China-s-apple-farmers-to-pollinate-by-hand.

crops by hand.[14] Without bees we would be forced to survive on wind-pollinated crops: wheat, barley, corn, and little else.[15] The rescue and protection of bees is necessary for the conservation and sustainable development of nature, society and the health and wellbeing of the planet as a whole. Part I of this paper examines the clear scientific link between pesticides and CCD. Part II fleshes out flaws in current common law, congressional and Environmental Protection Agency (EPA) regulation. Lastly, Part III calls for a prohibition on neonicotinoid pesticides, as well as proposes several alternatives which would not completely resolve the issue, but would aid in decreasing CCD.

## I. SCIENTISTS LINK MASS BEE DEATH TO PESTICIDE USE

Since 2007, scientists have increased their efforts to find a cause for the death and disappearance of the bee population.[16] Studies have focused on the common use of pesticides in modern agriculture and their link to CCD.[17] The issue is complex, with many factors potentially contributing to the cause;[18] however, pesticides have consistently been shown as a key contributor in pollinator declines and current evidence suggests that pesticides are the greatest cause of CCD.[19] CCD follows not just from immediate bee deaths, but also from sublethal exposure which can disrupt bee reproduction, queen health, and worker bee navigation and foraging.[20] Although there are many

[14] *Id*.
[15] *Id*.
[16] *What the Science Shows*, BEYOND PESTICIDES, http://www.beyondpesticides.org/pollinators/research.php#BeeImpacts (last updated Fed. 27, 2015).
[17] *See, e.g.*, Erik Stokstad, *Field Research on Bees Raises Concern About Low-Dose Pesticides*, 335 SCIENCE 1555, 1555 (2012).
[18] CCD Steering Comm., U.S. Dep't of Agric., *Colony Collapse Disorder Progress Report*, at Executive Summary (2010), *available at* http://www.ars.usda.gov/is/br/ccd/ccdprogressreport2010.pdf.
[19] Chensheng Lu et al., *In Situ Replication of Honey Bee Colony Collapse Disorder*, 65 BULL. INSECTOLOGY 99, 99 (2012).
[20] Dennis vanEngelsdorp & Marina Doris Meixner, *A Historical Review of Managed Honey Bee Populations in Europe and the United States and the Factors that may Affect Them*, 103 J. INVERTEBRATE PATHOLOGY S89 (2010); *What the Science Shows*, BEYOND PESTICIDES, http://www.beyondpesticides.org/pollinators/research.php#BeeImpacts (last updated Fed. 27, 2015).

different types of pesticides, research has focused on neonicotinoids due to their common use and ill effect on pollinators, even at small doses.[21]

At both sublethal and realistic field level doses, scientists discovered neonicotinoids pose a serious threat to the bee population. A 2014 study, published in the *Bulletin of Insectology*, undercuts arguments that neonicotinoids are not the primary contributing factor in CCD.[22] The results found that hives exposed to low doses of two neonicotinoid pesticides did not recover from winter losses in the same way that control hives recovered.[23] Another 2014 study, published in the journal *Ecotoxicology*, reveals that near infinitesimal exposure to neonicotinoids reduces bees' ability to gather food by 57 percent.[24] These studies suggest that field realistic doses of these pesticides may substantially impact the foraging ability of bee workers when collecting pollen, and suggests a causal link for reduced queen production in neonicotinoid-exposed colonies.[25]

Furthermore, neonicotinoids have been found to reduce bee colony growth, maturity and to cause weakened immune systems. When exposed to field realistic levels, colonies suffered an 85 percent reduction in new queen production compared with control colonies.[26] A 2009 study published in *Environmental Contamination and Toxicology* found that both bifenthrin and deltamethrin (two neonicotinoid pesticides) significantly reduced bee fertility, decreased the rate at which bees develop to

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[21] Dan Charles, *Are Agriculture's Most Popular Insecticides Killing Our Bees?*, NAT'L PUB. RADIO (Mar. 25, 2013, 6:08 PM), http://www.npr.org/blogs/thesalt/2013/03/27/175278607/are-agricultures-most-popular-insecticides-killing-our-bees, archived at http://perma.cc/2H73-5DCU.
[22] Chensheng Lu et al., *Sub-lethal Exposure to Neonicotinoids Impaired Honey Bees Winterization Before Proceeding to Colony Collapse Disorder*, 67 Bull. INSECTOLOGY 125, 125 (2014), *available at* http://www.bulletinofinsectology.org/pdfarticles/vol67-2014-125-130lu.pdf.
[23] *Id*.
[24] Hannah Feltham et al., *Field Realistic Doses of Pesticide Imidacloprid Reduce Bumblebee Pollen Foraging Efficiency*, 23 ECOTOXICOLOGY 317 (2014).
[25] *Id*.
[26] Penelope R. Whitehorn et al., *Neonicotinoid Pesticide Reduces Bumble Bee Colony Growth and Queen Production*, 336 SCIENCE 351, 351 (2012).

adulthood, and increased their immature periods.[27] The interaction between the microsporidia Nosema and a neonicotinoid was shown to significantly weaken honeybees' immune systems.[28] The combination of both agents caused the highest individual mortality rates and energetic stress.[29] This study provided the first evidence that the interaction between an infectious organism and a chemical can also threaten pollinators, interactions that are widely used to eliminate insect pests in integrative pest management.[30]

Neonicotinoids' longevity has further complicated the problem. Farmers can apply neonicotinoid pesticides to the seed prior to sowing, or to the plant and soil directly.[31] This pesticide can stay in the soil years after application, meaning that future untreated crops can absorb the chemical residue and continue to transfer the pesticide to bees.[32] This long lasting residue poses serious problems because, as highlighted above, even small sublethal doses of pesticides can cause significant damage to the bee population. Scientists have proven that even low levels of neonicotinoid exposure lead to defective navigation, reduced immune systems, reduced queen population, increased parasitic growth and much more.[33]

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[27] Dai, P.-L. et al., *Effects of Sublethal Concentrations of Bifenthrin and Deltamethrin on Fecundity, Growth, and Development of the Honeybee Apis Mellifera Ligustica*. 29 ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY 644 (2010).
[28] Alaux, C., Brunet et al., *Interactions Between Nosema Microspores and a Neonicotinoid Weaken Honeybees*, 12 ENVIRONMENTAL MICROBIOLOGY 774 (2010).
[29] *Id*.
[30] *Id*.
[31] Jennifer Hopwood et al., *Are Neonicotinoids Killing Bees? A Review of Research Into the Effects of Neonicotinoid Insecticides on Bees, with Recommendations for Action*, XERCES SOC'Y FOR INVERTEBRATE CONSERVATION, 3 (2012), *available at* http://www.xerces.org/wp-content/uploads/2012/03/Are-Neonicotinoids-Killing-Bees_Xerces-Society1.pdf.
[32] *Id*.
[33] Rosemary Mason et al., *Immune Suppression by Neonicotinoid Insecticides at the Root of Global Wildlife Decline*, 1 J. ENVTL. IMMUNOLOGY & TOXICOLOGY 2, 8 (2014), *available at* http://www.stmconnect.com/sites/default/files/3-12%20%20JEIT-2014.pdf.; Micka l Henry et al., *A Common Pesticide Decreases Foraging Success and Survival in Honey Bees*, 336 SCIENCE 348, 348 (2012); Jeffery S. Pettis et al., *Pesticide Exposure in Honey Bees Results in Increased Levels of the Gut Pathogen Nosema*, 99 NATURWISSENSCHAFTEN 153, 155 (2012).

Some studies discount the role neonicotinoids play in the death of the bees. These studies have ultimately blamed CCD on factors such as fungus, mites, and monoculture.[34] A handful of others have accused scientists of getting results (like the ones discussed above) by exposing bees to unrealistic and extreme doses of pesticides.[35] Additionally, many of these skeptics have argued that neonicotinoids are not the sole factor responsible for CCD. These contradicting studies have ignored the overwhelming amount of data collected by scientists around the world by exposing bees to sublethal and field realistic levels. These opposing studies do not explain the European Commission's similar findings and its decision to ban the use and sale of neonicotinoids.[36] Despite an in-depth search, no studies could be found that showed neonicotinoids do not contribute to CCD.

However, scientists have acknowledged other contributing factors and have consistently found that neonicotinoids make colonies more susceptible to fungus and mites, among other threats, for example by weakening bee immune systems.[37] The scientific evidence has overwhelmingly pointed to the deadly impact neonicotinoids have on bees, strongly suggesting a need for strict government regulation of pesticides. If we protect our pollinators by restricting, regulating, educating or even simply ending the use of neonicotinoid pesticides, we can prevent several different causes of colony collapse disorder.

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[34] Russell Goodman, *Nosema Disease of Honey Bees*, DEP'T ENV'T & PRIMARY INDUS. (Oct. 2009), http://www.depi.vic.gov.au/agriculture-and-food/pests-diseases-and-weeds/animal-diseases/bees/nosema-disease-of-honey-bees, *archived at* http://perma.cc/3TAN-2EYV; Stephen J. Martin et al., *Global Honey Bee Viral Landscape Altered by a Parasitic Mite*, 336 SCIENCE 1304 (2012); Dan Charles, *Wild Bees are Good for Crops, But Crops are Bad for Bees*, NAT'L PUB. RADIO (Mar. 1, 2013, 2:56 AM), http://www.npr.org/blogs/thesalt/2013/03/01/173167125/wild-bees-are-good-for-crops-but-crops-are-bad-for-bees, *archived at* http://perma.cc/92BM-VBCK.

[35] Jon Entine, *Bee Deaths Reversal: As Evidence Points Away From Neonics as Driver, Pressure Builds to Rethink Ban*, FORBES (Feb. 5, 2014, 10:30am), http://www.forbes.com/sites/jonentine/2014/02/05/bee-deaths-reversal-as-evidence-points-away-from-neonics-as-driver-pressure-builds-to-rethink-ban/; http://www.biofortified.org/2014/06/are-neonicotinoids-the-sole-factor-responsible-for-colony-collapse-disorder/.

[36] U.S. Environmental Protection Agency, *Colony Collapse Disorder: European Bans on Neonicotinoid Pesticides*, http://www.epa.gov/pesticides/about/intheworks/ccd-european-ban.html (last updated Aug. 15, 2013).

[37] See discussion above.

## II. CURRENT INEFFECTIVE SOLUTIONS

Despite ample scientific data linking pesticide use to CCD, and the grave consequences associated with the disappearance of bees, the US currently lacks adequate regulation to protect bees. Courts have applied several tort law and other common law theories when dealing with damages from modern pesticide use; however, many variations throughout and within jurisdictions make enforcement and deterrence confusing and inefficient.[38] While a handful of states have taken important steps in an attempt to combat CCD, at this point their efforts are inconsistent and inadequate to resolve the problem.

Congress and the EPA are aware of the dangers associated with pesticides and CCD, but when faced with the need to address the problem the federal government has stalled. Congress has attempted to adopt legislation that would force the EPA to combat CCD with meaningful regulations, but these bills have routinely died in committee.[39] The bills that Congress has passed only fund research on CCD and are devoid of any solution to the problem.[40] The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) gives the EPA the primary responsibility for regulating pesticides.[41] This federal law has significant limitations in its ability to prevent or minimize bee harm. The most significant shortcoming with FIFRA is its limited authority to regulate the actual use of pesticides.[42]

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[38] Alexandra B. Klass, *Bees, Trees, Preemption, and Nuisance: A New Path to Resolving Pesticide Land Use Disputes*, 32 ECOLOGY L.Q. 763, 792-93 (2005).

[39] *See* Saving America's Pollinators Act of 2013, H.R. 2692, 115th Cong. (died in committee, July 16, 2013); Farm, Nutrition, and Community Investment Act of 2007, S. 1424, 110th Cong. (died in committee, May 17, 2007); Pollinator Protection Act, H.R.1709, 110th Cong. (died in committee, Mar. 27, 2007).

[40] *See, e.g.*, 2008 Farm Bill, 122 Stat. 1651, 72044(h).

[41] 7 U.S.C. §§136-136(y).

[42] Mary Jane Angelo et al., *Food, Agriculture, and Environmental Law* 140 (2013).

*A. Tort Law and Other Common Law*

The lack of clarity in case law is not providing the incentive or deterrence needed to change farmers' behavior, avoid liability, and protect bees. Combined with the scarcity of cases dealing with the duty of care a pesticide applier owes to foraging bees, the standards courts apply vary greatly by jurisdiction and give little guidance as to the scope of the farmer's duty to bees.[43]

Some state courts have chosen to apply the traditional negligence standard when bees are harmed due to pesticides. One court established the rule that landowners who have knowledge or notice of foraging honey bees on their property owe a duty of reasonable care to the bees when applying pesticides.[44] However, the definition of "reasonable care" is unclear. Furthermore, the plaintiffs, who are usually bee keepers, will likely find it very challenging to prove the pesticide application was the "but for" cause of the bee death. This is especially true when the hive's death was due to a weakened immune system caused by the pesticide and ultimately compromised by a parasite or virus.

Other states have used a strict liability standard, but only in cases where the pesticide had drifted from the landowner's property to the property housing the bees.[45] These "pesticide drift" cases do not adequately address the problem because bees' primary exposure to pesticides is by flying to farmers' property and pollinating the pesticide-ridden crops.[46] To add to the confusion, despite

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[43] Melanie Triplett, Note, *Case Note: Torts-Buzz Off! Expanding the Scope of a Landowner's Duty to Honey Bees Flying Along the Fine Line of Trespassing in Anderson v. State Department of Natural Resources*, 32 WM. MITCHELL L. REV. 1489, 1490 (2006).

[44] *Anderson v. State Dep't of Natural Res.*, 693 N.W.2d 181 (Minn. 2005).

[45] *See* Theodore A. Feitshans, *An Analysis of State Pesticide Drift Laws*, 9 SAN JOAQUIN AGRIC. L. REV. 37, 48, 51-53, 65, 82, 84 (1999).

[46] Joe Traynor, *How Far Do Bees Fly? One Mile, Two Seven? And Why?*, BEE SOURCE (June 2002), http://www.beesource.com/point-of-view/joe-traynor/how-far-do-bees-fly-one-mile-two-seven-and-why/, *archived at* http://perma.cc/7CUN-X87H.

FIFRA's failure to provide a private right of action,[47] some states have created regulation granting individuals the right to sue if pesticides are used against the label instructions.[48] Despite the need for a private right of action, until it is uniformly applied throughout the United States, it will continue to add to the confusion and patchwork of laws. Courts have also applied property law theories when dealing with damages from pesticide use.[49] Once again, the many variations of legal standards applied give little clarity and make enforcement difficult.

B. *State Regulation*

States have experimented with a wide variety of regulatory tools including notice procedures, spray timing limitations, and outright bans. Although these tools are attempts to combat CCD and are steps in the right direction, they are not enough to adequately address the problem. In fact, some may even have contributed to the decline in bee population.

Some states like California have attempted to take action to combat CCD. To reduce bee deaths from pesticides California has enacted several laws. For example, farmers must notify local beekeepers before spraying certain pesticides[50] and are prohibited from spraying these pesticides during bloom times when bees are most likely foraging.[51] California is also among several states that have developed programs to map out bees in the area to help provide notification when pesticides are going

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[47] *See Bates v. Dow Agrosciences, LLC*, 544 U.S. 431, 448 (2005); *Voss v. Saint Martin Co-op*, 376 F. App'x. 662, 663 (8th. Cir. 2010).

[48] *See, e.g.*, Wis. Stat. Ann. § 94.70(3)(g) (West 2013) (prohibiting the use of pesticide in a manner inconsistent with labeling).

[49] Alexandra B. Klass, *Bees, Trees, Preemption, and Nuisance: A New Path to Resolving Pesticide Land Use Disputes*, 32 ECOLOGY L.Q. 763, 792-93 (2005).

[50] Ann N. Coenen-Davis, Note, *The Mystery of the Disappearing Honeybee: Will Government Funding and Regulation Save this Important Pollinatory?*, 14 Drake J. Agric. L 175, 192-193 (2009).

[51] Cal Code Regs. tit. 3 §§ 6650-6656 (2014)

to be used.[52] For example Colorado beekeepers map their hive locations online on DriftWatch,[53] a Google Earth map used to indicate nearby crops, beehives and wind farms.[54] California has similar plans requiring some beekeepers to add their name to a registry held by country agriculture commissioners.[55] In Florida the registry is voluntary, and in North Dakota the registry is required, but notification is voluntary when pesticides are going to be applied.[56] In Mississippi, beekeepers are voluntarily hanging yellow and black flags on hives that may be hidden to warn pesticide sprayers to be careful about pesticide drift and to avoid spraying while the bees are flying.[57] This program "'is setting a precedent by showing there is cooperation and commitment on both sides. They're willing to work together to minimize the risk of economic losses by both the beekeepers and the farmers,' said Jeff Gore, entomologist with the Mississippi Agricultural and Forestry Experiment Station and MSU Extension Service. 'The Bee Aware flags that resulted from this agreement are an additional tool to help raise everyone's awareness about pollinator health and protecting pollinators.'"[58]

Although these notification plans are a good start, they do not solve the problem and arguably can be contributing to CCD. For one, these programs assume that giving beekeepers notice of nearby spraying will make moving the bees an easy task. Even assuming we are not worried about unmanaged wild bees, and assuming the beekeepers have an alternate location to take the colony, moving heavy hives is often impossible and can cause stress, lowered immune systems and contribute to CCD.[59] It is

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[52] Tiffany Stecker, *Pesticides: State Pollinator Plans Eschew Regs, Promote Beekeeper-Farmer Cooperation*, Greenwire (Mar. 9, 2015), http://www.eenews.net/greenwire/stories/1060014700/search?keyword=Beekeeper.
[53] DRIFTWATCH, https://driftwatch.org/map (last visited May 13, 2015).
[54] Tiffany Stecker, *Pesticides: State Pollinator Plans Eschew Regs, Promote Beekeeper-Farmer Cooperation*, Greenwire (Mar. 9, 2015), http://www.eenews.net/greenwire/stories/1060014700/search?keyword=Beekeeper.
[55] *Id.*
[56] *Id.*
[57] *Id.*
[58] Keri Collins Lewis, *MSU Extension Joins Effort to Protect State's Honeybees*, MISSISSIPPI AGRICULTURE NEWS (Feb. 3, 2014), http://msucares.com/news/print/agnews/an14/20140203_bees.html.
[59] Alexei Barrionuevo, *Honeybees, Gone With the Wind, Leave Crops and Keepers in Peril*, N.Y. TIMES (Feb. 27, 2007), http://select.nytimes.com/gst/abstract.html?res=F10B1FF8355A0C748EDDAB0894DF404482, *archived at* http://perma.cc/4JGD-SMLT.

also a concern here that a notice system puts the avoidance burdens on hive owners instead of on pesticide sprayers. Encouragingly, however, some studies show that if hives are safely moved relatively short distances to similar climate conditions and resource availability, the relocation will not be detrimental to the hive.[60]

Limiting pesticide application during bloom season will help combat CCD when only non neonicotinoid pesticides are being used. Considering neonicotinoids account for forty percent of the pesticide market and their residue can remain in the soil and plant for years, unless their use is stopped completely it will not resolve the deadly impact on bees.[61] Additionally, while limiting application to times when bees are least active may avoid the direct spraying of bees, the strategy does not address the more pervasive problem of bees' exposure to pesticides through already treated plants.

After several massive bee death incidents in Oregon, including one where a licensed pesticide applicator sprayed blooming trees in violation of the pesticide label killing more than 50,000 bumblebees, Eugene became the first community in the nation to specifically ban the use of neonicotinoid pesticides on city property.[62] Although this does not limit the use of neonicotinoids on private farming property, there are other states and communities that continue to push for more legislative action. In California, beekeepers and environmental advocates supported a bill that would force California to complete its evaluation of neonicotinoid pesticides years ahead of the EPA review, which is not scheduled to be completed before 2018.[63] In a crushing blow, the State Senate voted to

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[60] Fiona C. Riddell Pearce et al., *Hive Relocation Does Not Adversely Affect Honey Bee (Hymenoptera: Apidae) Foraging*, PSYCHE (2013).
[61] Todd Woody, *The U.S. Bans GMOs, Bee-Killing Pesticides in All Wildlife Refuges*, TAKEPART (July 31, 2014), http://www.takepart.com/article/2014/07/31/us-bans-gmos-bee-killing-pesticides-national-wildlife-refuges; Dave Goulson, *An Overview of the Environmental Risks Posed by Neonicotinoid Insecticides*, 50 J. APPLIED ECOLOGY 977, 979 (2013).
[62] *Community Passes Resolution Banning Neonicotinoids*, BEYOND PESTICIDES (Mar. 5, 2014), http://www.beyondpesticides.org/dailynewsblog/?p=12881.
[63] Assembly Bill No. 1789, Chapter 578 (2014), *available at* http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201320140AB1789.

delay a requirement for action on neonicotinoid pesticides until 2020.[64] Similarly, New Jersey has introduced and referred to the Assembly Agriculture and Natural Resources Committee a bill that would prohibit the use and sale of neonicotinoid pesticides altogether;[65] however, at this point it is still unclear if it will be passed.

Although some of these initiatives are promising, they are inadequate, as currently formulated, to solve the problem for several reasons. First, not all bees can be moved safely after beekeepers are notified about planned pesticide use. Even if bees are able to be moved temporarily during spraying, neonicotinoids can remain for years after being applied and this residue itself has a deadly impact on bees. Second, current voluntary programs are not enough to incentivize farmers to effectively change their behavior or not apply neonicotinoids completely. More importantly, because many states have taken no action, the current patchwork regulates only a small subset of pesticide users.

Although it is difficult to explain state behavior with certainty, a number of possible explanations for their unwillingness to impose strict regulations likely exist. First, it may be that states simply do not believe that pesticides are contributing to CCD; second, many states have influential farming lobbyists who would make this an uphill political battle;[66] third, states may fear the cost of needed regulation; and fourth, states may not want to disadvantage their own agricultural business if other states do not follow suit.[67] Because of these problems, and the potential lack of uniformity throughout the states, the best regulation would likely be one that applied nationwide.

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[64] *Id.*

[65] H.R. 4349, 215th Gen. Assemb., Reg. Sess. (N.J. 2013); *available at* http://www.njleg.state.nj.us/2012/Bills/A4500/4349_I1.PDF.

[66] This is an interesting issue for farmers because their own long term and short term interests are in conflict.

[67] The term "collective action problem" describes the situation in which multiple individuals would all benefit from a certain action, but has an associated cost making it implausible that any one individual can or will undertake and solve it alone.

*C. Congress*

Congress has the power to regulate, limit or even ban certain pesticide use. However, considering most bills forcing EPA to confront CCD with strict regulation have died in committee, it seems Congress is unwilling to exercise this power.[68] Ignoring the urgency of the bee decline, the only bills Congress has passed have been to fund CCD studies or provide disaster assistance insurance to honeybee farms.[69] The provisions of the bills purport to "support pollinators,"[70] however, they do nothing to prevent or deter their death in the first place. Although Congress has acknowledged the serious problem of CCD and numerous studies linking bee deaths to pesticide use, it has refused to implement the strict regulation needed at this time.

As discussed above, Representatives of states with a large agricultural business are likely reluctant to vote for stricter pesticide regulation or prohibitions on neonicotinoid pesticide sale or use. With short office terms of two to six years, members of Congress are more likely to focus on short-term issues and are also incentivized to follow their constituents' wishes.[71] A recent example of this was the Saving America's Pollinator Act, H.R 2692, introduced by Reps. John Conyers and Earl Blumenauer in 2013.[72] The bill sought to suspend the use of neonicotinoid pesticides until a full review of scientific evidence and a field study demonstrated no harmful impacts to pollinators.[73] This bill was gaining bipartisan support in the House and was endorsed by several environmental groups,

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[68] *See, e.g.*, Farm, Nutrition, and Community Investment Act of 2007, S. 1424, 110th Cong. (2007); Pollinator Protection Act, H.R. 1709, 110th Cong. (2007).
[69] *See, e.g.*, 2008 Farm Bill, 122 Stat. 1651, 7204(h); Renee Johnson, *Honey Bee Colony Collapse Disorder*, CONGRESSIONAL RESEARCH SERVICE (Jan. 7, 2010), https://fas.org/sgp/crs/misc/RL33938.pdf.
[70] *Id.*
[71] I.e. If farmers in big agriculture states do not want strict regulation on pesticides, their Representatives are not incentivized to vote for those regulations.
[72] Saving America's Pollinators Act of 2013, H.R. 2692, 113th Cong. (2013); *Conyers and Blumenauer Introduce Legislation Protecting Pollinators and America's Food System*, JOHN CONYERS, JR. (Jul. 16, 2013), http://conyers.house.gov/index.cfm/2013/7/conyers-and-blumenauer-introduce-legislation-protecting-pollinators-and-america-s-food-system.
[73] *Id.*

including Beyond Pesticides, Center for Food Safety, Center for Biological Diversity, Earthjustice and others; however, it died in committee.[74] Despite several strong pushes for strict pesticide regulation, Congress has not been willing to pass the needed regulation to protect bees.

### *D. EPA and FIFRA*

The EPA has the primary responsibility for regulating pesticides under FIFRA.[75] Generally, FIFRA establishes a licensing program for pesticides manufactured, distributed or sold in the United States.[76] FIFRA requires a premarket review and data collection of all pesticides and provides that an EPA administrator shall register a pesticide if determined that when "used in accordance with widespread and commonly recognized practice, it will not generally cause unreasonable adverse effects on the environment."[77] Despite the legislative history of FIFRA suggesting that adverse effects were not intended to be tolerated in absence of "overriding benefits,"[78] for the past thirty years when determining whether to register a pesticide the EPA has interpreted FIFRA to require a cost-benefit balancing except in the case of human dietary risk.[79] There is no requirement to demonstrate that a pesticide is essential, and the availability of a safer alternate pesticide does not preclude registration.[80] Additionally, under expressed authority of FIFRA, EPA has waived all data requirements pertaining to efficacy; thus EPA does not require any showing of benefit to be derived from the pesticide and instead assumes such benefit will occur.[81]

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[74] H.R. 2692; *Community Passes Resolution Banning Neonicotinoids*, BEYOND PESTICIDES (Mar. 5, 2014), http://www.beyondpesticides.org/dailynewsblog/?p=12881.

[75] 7 U.S.C. §§136-136(y).

[76] Mary Jane Angelo et. al., *Food, Agriculture, and Environmental Law* 130 (2013).

[77] 7 U.S.C. §136a(c)(5).

[78] William H. Rodgers, *Environmental Law* 451-53 (West, 2d ed. 1994).

[79] Mary Jane Angelo et. al., *Food, Agriculture, and Environmental Law* 131 (2013).

[80] 7 U.S.C. §136a(c)(5)(B).

[81] 40 C.F.R. §158.640(b)(1); Mary Jane Angelo et. al., *Food, Agriculture, and Environmental Law* 131 (2013).

Unlike many other environmental statutes, FIFRA does not establish a permitting system for pesticide use; instead, regulation of pesticide use is achieved through requiring all users of pesticides to follow label directions.[82] Unfortunately, it is virtually impossible for EPA to monitor and know how persons are using pesticides,[83] so enforcement is almost nonexistent. Further, many environmental groups, beekeepers and pesticide applicators are frustrated with the agency's pollinator warning labels, saying the language is not explicit enough.[84] Thus even if the EPA could enforce applicators to follow label directions, the directions themselves are not adequate enough to protect the bees. Moreover, the EPA cannot efficiently enforce an ambiguous or unclear label that could be subject to many interpretations.

Under FIFRA, the EPA has the ability to require a certified applicator to supervise certain pesticide application. Over one-half of all registered pesticides have been classified by the EPA as "restricted use"[85] and thus cannot be purchased by the general public and must be applied only under the supervision of a certified applicator.[86] Certification of applicators is primarily conducted by the state with EPA certification plan approval.[87] Unfortunately many states only require recertification or training every five years,[88] do not mandate consideration or education of local ecological factors or lower risk alternatives, and ultimately the law does not require certified applicators to even be present during pesticide application.[89] Finally, FIFRA §11 expressly states that certified applicators are not

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[82] 7 U.S.C. §136a(c)(1)(C); Mary Jane Angelo et. al., *Food, Agriculture, and Environmental Law* 132, 33 (2013).
[83] *Id.*
[84] Tiffany Stecker, *Pesticides: State Pollinator Plans Eschew Regs, Promote Beekeeper-Farmer Cooperation*, Greenwire (Mar. 9, 2015), http://www.eenews.net/greenwire/stories/1060014700/search?keyword=Beekeeper.
[85] Rodgers, *supra* note 55, at 458.
[86] Mary Jane Angelo et. al., *Food, Agriculture, and Environmental Law* 133 (2013).
[87] 7 U.S.C. §136i(a)(2), *available at* http://www.epa.gov/opp00001/regulating/fifra.pdf.
[88] *See e.g.*, State of New Jersey Dep't of Environmental Protection Compliance & Enforcement, *Commercial Pesticide Applicator*, http://www.nj.gov/dep/enforcement/pcp/bpo-appcom.htm (last visited May 13, 2014).
[89] Mary Jane Angelo et. al., *Food, Agriculture, and Environmental Law* 133 (2013); *see* Rodgers, *supra* note 55, at 462-463.

required to receive instruction on integrated pest management and are not required to be competent with respect to such techniques.[90] The supervision of a certified applicator can be a very useful tool in combatting CCD; however, as it stands, the system is flawed and this tool is underutilized.

The EPA has the authority under the "imminent hazard" provision of FIFRA to immediately suspend a pesticide's registration.[91] The term "imminent hazard" means a situation which exists when the continued use of a pesticide during the time required for cancellation proceeding would be likely to result in unreasonable adverse effects on the environment or will involve unreasonable hazard to the survival of a species declared endangered or threatened by the Secretary pursuant to the Endangered Species Act of 1973.[92] In 2012 the EPA was presented with the opportunity to use the imminent hazard provision to suspend the registration of clothianidin, a neonicotinoid.[93] The EPA disagreed that clothianidin caused CCD and further suggested that neonicotinoids, in general, are unlikely to be considered an imminent hazard.[94]

The US Fish and Wildlife Service's National Wildlife Refuge System has recently announced its plan to limit neonicotinoid use. "We have determined that prophylactic use, such as a seed treatment, of the neonicotinoid pesticides that can distribute systemically in a plant and can affect a broad spectrum of non-target species is not consistent with Service policy," James Kurth, chief of the

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[90] 7 U.S.C. §136i(a)(2).

[91] Letter from Stephen P. Bradbury, Dir., Office of Pesticide Programs, U.S. Envtl. Prot. Agency, to Steve Ellis, Sec'y, Nat'l Honey Bee Advisory Bd. et al. (Feb. 18, 2011), *available at* http:// www.epa.gov/pesticides/about/intheworks/clothianidin-response-letter.pdf.

[92] 7 U.S.C. § 136(l) (2012).

[93] Ctr. for Food Safety, *Emergency Citizen Petition to the United States Environmental Protection Agency Seeking Suspension of Registration for Clothianidin* 31-33 (2012), *available at* http:// www.beyondpesticides.org/pollinators/documents/CFS-Clothianidin-Petition-3-20-12.pdf.

[94] Letter from Stephen P. Bradbury, Dir., Office of Pesticide Programs, U.S. Envtl. Prot. Agency, to Peter T. Jenkins, Ctr. for Food Safety & Int'l Ctr. for Tech. Assessment 11 (July 17, 2012), *available at* http:// www.epa.gov/pesticides/about/intheworks/epa-respns-to-clothianidin-petition-17july12.pdf.

National Wildlife Refuge System, wrote in a July 17 memo.[95] The US Fish and Wildlife Service's National Wildlife Refuge System, which manages 150 million acres across the country, announced that as of January 2016 the agency will ban the use of neonicotinoids in national wildlife refuges.[96] This is a huge step in tackling the CCD problem; however, it still leaves 914 million acres of farmland free to use this bee killing pesticide.[97] Despite existing private law mechanisms and efforts at both the state and federal level, CCD is not being addressed adequately and bees are continuing to die from pesticide use. Clear, consistent and strong regulation is needed to fix the problem.

## III. FIXING THE PROBLEM—BALANCING THE NEED FOR PESTICIDES WITH THE NEED FOR BEES

### *1. Prohibiting the Use and Sale of Neonicotinoid Pesticides*

A first best solution would be for Congress to pass a law prohibiting neonicotinoid sale and use, much like the European Commission has.[98] However, due to current political constraints this is likely not a realistic option. Since the EPA does not have the same political incentives as Congress, and an action by an administrative agency does not require further ratification from Congress,[99] the EPA is likely the most efficient actor who can develop and implement a solution for dealing with CCD. Even without the support of agricultural business, a blanket ban on neonicotinoid sale and use would allow the EPA to efficiently focus on the long-term commitment of reducing CCD. Unlike

[95] Memorandum from Chief, National Wildlife Refuge System, to Regional Refuge Chiefs, Regions 1-8 (July 17, 2014), *available at* http://www.centerforfoodsafety.org/files/agricultural-practices-in-wildlife-management_20849.pdf.
[96] Todd Woody, *The U.S. Bans GMOs, Bee-Killing Pesticides in All Wildlife Refuges* (July 2014), *available at* http://www.takepart.com/article/2014/07/31/us-bans-gmos-bee-killing-pesticides-national-wildlife-refuges.
[97] U.S Environmental Protection Agency, *Land Use Overview*, http://www.epa.gov/agriculture/ag101/landuse.html (last updated Apr. 9, 2013).
[98] U.S. Environmental Protection Agency, *Colony Collapse Disorder: European Bans Neonicotinoid Pesticides*, http://www.epa.gov/pesticides/about/intheworks/ccd-european-ban.html (last updated Aug. 15, 2013).
[99] Kelsey Ott, *Buzzkill: How the EPA's Inaction Is Killing America's Bees*, 39 WM. & MARY ENVTL. L. & POL'Y REV. 401, 418 (2015).

common law, this uniform prohibition on neonicotinoid pesticides will provide farmers and pesticide applicators with clear guidelines.

There are several potential arguments against the prohibition of neonicotinoid pesticides to which this section will respond. One of the most common is that pesticides are not the only cause of CCD. As discussed previously, evidence suggests that pesticides are the primary cause of CCD. Neonicotinoids account for forty percent of the global pesticide market.[100] Even though viruses, bacteria, etc. have also been linked to CCD it has been scientifically proven that neonicotinoids increase the susceptibility of bees by lowering their immune system. Although banning neonicotinoid use will not guarantee survival, it should significantly lower the amount of deaths associated with these other causes.

Another common argument is that banning pesticides effectively leaves farmers without pest control. This is simply untrue. Besides using available less toxic non neonicotinoid pesticides, there are many alternative methods of controlling unwanted insects. These include crop rotation, polyculture, trap crops, organic farming, hydroponic farming and biological pest control, such as pheromones, entomopathogenic fungi, bacteria, viruses, and the release of other organisms such as natural pest predators and parasites.[101] In light of CCD, many scientists have focused on developing bee-friendly pesticides. For example, biologists at the University of Newcastle combined the venom of an Australian funnel spider with snowdrop plant protein to make a bee-friendly pesticide called Hv1a/GNA.[102] When directly fed very high doses of this pesticide, scientists found that it was fairly

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[100] Todd Woody, *The U.S. Bans GMOs, Bee-Killing Pesticides in All Wildlife Refuges*, TAKEPART (July 31, 2014), http://www.takepart.com/article/2014/07/31/us-bans-gmos-bee-killing-pesticides-national-wildlife-refuges.

[101] S*ee Alternatives to Using Pesticides*, SOUTHERN STATES, *available at* http://www.southernstates.com/articles/pesticide-alternatives.aspx (last visited May 13, 2015); Callie Seaman & Neil Bricklebank, *Soil-Free Farming*, 6 CHEMISTRY & INDUS. 19, 19-20 (Mar. 21, 2011).

[102] Sarah Griffiths, *Bee-friendly Pesticide Created from SPIDER VENOM Usually Strong Enough to Kill a Man*, DAILY MAIL (June 4, 2014), http://www.dailymail.co.uk/sciencetech/article-2647460/Bee-friendly-pesticide-created-SPIDER-VENOM-strong-kill-man.html.

harmless to bees, and does not affect learning or memory. There are also many other effective pesticides on the market that are very bee friendly.[103] Several genetic engineering practices are also bee safe, such as insect breeding interference and RNA interference. RNA interference, in particular, can control a specific pest by targeting a specific gene sequence, meaning it can kill one specific type of insect without harming others.[104]

Another argument that could be posed against the ban on neonicotinoid pesticides is limited EPA resources. The inability of the EPA to enforce its current regulations has been a consistent critique of the EPA.[105] However, a ban is easier to enforce than is compliance with a complicated label since the EPA could target sales rather than individual farmer behavior. Additionally, the regulation could allow parties with standing[106] to have a private right of action, allowing them to sue individuals who violate the neonicotinoid ban and thus provide effective deterrence without expending additional EPA resources.[107] In fact, allowing a private right to action in general would further deter all farmers and pesticide applicators from violating many of the current regulations EPA is currently having a difficult time enforcing. Definitive consequences from the EPA and the potential of being sued by the public will likely push the farmer to be more conscious of his or her actions. It will also create an incentive to investigate and use safer alternatives. Additionally, unlike limiting pesticide application,

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[103] Eric Mader & Nancy Lee Adamson, *Xerces Soc'y for Invertebrate Conservation Organic-Approved Pesticides: Minimizing Risks to Bees* 3 (2012), *available at* http://www.xerces.org/wp-content/uploads/2009/12/xerces-organic-approved-pesticides-factsheet.pdf.

[104] John P. Burand & Wayne B. Hunter, *RNAi: Future in Insect Management*, 112 J. INVERTEBRATE PATHOLOGY S68, S71 (2013); *See also* Kai Kupferschmidt, *A Lethal Dose of RNA*, 341 SCIENCE 732 (2013).

[105] *See* Brandon Keim, *EPA's Pollution-Busting Cops Have Lost Focus, Say Watchdogs*, WIRED (Sept. 15, 2010, 3:53 PM), *available at* http://www.wired.com/wiredscience/2010/09/obama-epa-investigations, *archived at* http://perma.cc/WK9H-PBX5.

[106] Such as beekeepers, farmers, and local communities who would face harm from continued neonicotinoid use.

[107] The EPA generally can't create private rights of action. This element of the proposal would require congressional action.

which would require close monitoring, a blanket ban on the sale or use of neonicotinoids is much simpler to enforce.

When instituting a new regulation the EPA must complete a cost-benefit analysis.[108] Considering that in 2000 the estimated value of crops in the United States pollinated by bees was 14.6 billion dollars;[109] that we currently have no technological means to replace that valuable service; and that hand pollinating all US crops would be impractical, very likely impossible, and very expensive, the cost of a bee extinction is very high.[110] Given the many alternative pest control methods discussed above and the relatively straightforward and low enforcement costs for the EPA, the costs associated with prohibiting neonicotinoid use is low. The ability to give clear guidelines, promote more effective and safer alternatives, rescue bee populations, and avoid billions of dollars in lost crops are benefits that clearly outweigh the costs. This is not including the reduction in water pollution and other negative effects of neonicotinoids.[111]

Overall, by prohibiting the use of neonicotinoid pesticides we can significantly reduce bee death due to direct pesticide poisoning, compromised health and immune systems, and decreased navigational capabilities. This bright line rule would give clarity to farmers and pesticide applicators as well as the EPA which, combined with the right of private action, would require low enforcement costs. It is the most efficient and effective solution to CCD.

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[108] Cass R. Sunstein, *The Stunning Triumph of Cost-Benefit Analysis*, BLOOMBERG VIEW (Sept. 12, 2012 6:30 PM), http://www.bloombergview.com/articles/2012-09-12/the-stunning-triumph-of-cost-benefit-analysis, *archived at* http://perma.cc/6EBD-AZVB.

[109] Morse R.A, Calderone N.W, *The value of honey bees as pollinators of U.S. crops in 2000*, Cornell University, Ithaca, New York (2000).

[110] Hillary Rosner, *Return of the Natives: Reviving Native Bee Species Could Save Honeybees-and Our Agricultural System-From Collapse*, SCI. AM. (Sept. 2013 Issue); Jennifer Sass, *Why We Need Bees: Nature's Tiny Workers Put Food on Our Tables*, NATURAL RES. DEF. COUNCIL (Mar. 2011), http:// www.nrdc.org/wildlife/animals/files/bees.pdf; *see e.g*. Dave Goulson, *Decline of Bees Forces China's Apple Farmers to Pollinate by Hand*, CHINADIALOGUE (Feb. 10, 2012), https://www.chinadialogue.net/article/show/single/en/5193-Decline-of-bees-forces-China-s-apple-farmers-to-pollinate-by-hand.

[111] Christy A. Morrissey et. al., *Neonicotinoid Contamination of Global Surface Waters and Associated Risk to Aquatic Invertebrates: A review*, ENVIRONMENT INTERNATIONAL (2014), *available at* www.elsevier.com/locate/envint.

*2. Alternative Options to Help Combat CCD*

The alternative options that are briefly discussed below will not by themselves resolve the issue of CCD and are by far not the only ways there could be improvements. This section sheds light on additional measures, such as a modification of the certified applicator program and awareness of the consumer's role in CCD, that could be taken. These suggestions will be particularly useful if neonicotinoids are not banned from the market.

**Licensed Applicators**

As discussed previously, there are many problems with certified pesticide applicators who are permitted to apply "restricted use" pesticides. If modified properly, the certification process of these applicators can serve as a very useful tool in combatting CCD. For one, requiring education on local ecological factors and lower risk pesticide alternatives to obtain recertification promotes awareness of different ecological sensitivities and encourages the use of safer options. Instead of simply requiring re-testing or training every five years from recertification, the program could transition to require continuing education credits, much like is required for emergency medical technicians (EMTs) and attorneys.[112] This continuing education credits requirement could include education on local ecological factors as well as classes offered on safer alternative options. This would insure that applicators are up to date on the newest and safest pesticides as well as on any environmental changes occurring in their state. A mandatory pre-pesticide application conversation between the certified applicator and the farmer will increase the farmer's awareness and likely contribute to the safer use of pesticides.

Because the EPA approves all state plans to certify pesticide applicators, the EPA is in the best position to mandate these changes in the plan. This will also insure a uniform requirement from all of

[112] S*ee* National Registry of Emergency Medical Technicians, *EMT,* THE NATION'S EMS CERTIFICATION, https://www.nremt.org/nremt/about/reg_basic_history.asp (last visited May 13, 2015); American Bar Association, *Mandatory CLE,* http://www.americanbar.org/cle/mandatory_cle.html (last visited May 13, 2015).

the country's certified applicators. Costs will ultimately be borne by the state and certified applicators who will pay for their continuing education credits and testing.

**Consumer Role in CCD**

Much of the public does not realize they are contributing to CCD. One of the main ways non farmers are adding to the problem is by purchasing plants that contain neonicotinoid pesticides. A 2014 study showed that 36 out of 71 (51 percent) garden plant samples purchased at top garden retailers, such as Home Depot and Lowes, in 18 cities in the United States and Canada contain neonicotinoid pesticides.[113] Some of the flowers contained levels high enough to kill bees outright and forty percent of the positive samples contained two or more neonicotinoids.[114] This means many home gardens have unknowingly become a source of exposure for bees.

An outright ban on garden retailers selling neonicotinoid-ridden plants would be ideal, but at minimum retailers should be required to inform the public about what they are purchasing. As of today, public pressure has successfully pushed Home Depot into requiring labelling of its nursery plants that are treated with neonicotinoid pesticides; however, places like Lowes and Wal-Mart have failed to follow suit.[115] The cost of producing the new label and the impact from consumers avoiding plants they now know contain these pesticides will push retailers from selling, and deter growers from using, neonicotinoid pesticides.

Even without a blanket prohibition on the use of neonicotinoids, consumers can still contribute to the ongoing efforts to save bees: for example, by supporting organic farmers who do not use toxic pesticides, using organic and non-toxic chemicals in personal gardens, planting bee friendly flowers or

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[113] Timothy Brown, *Gardeners Beware (2014): Bee-Toxic Pesticides Found in "Bee-Friendly Plants Sold at Garden Centers Across the U.S. and Canada* (2014), *available at* http://libcloud.s3.amazonaws.com/93/3a/3/4738/GardenersBewareReport_2014.pdf.

[114] *Id*.

[115] Jennifer Sass, *Home Depot and BJ's Wholesale Club Take Steps to Limit or Eliminate Bee-Killing Neonicotinoid Pesticides in Their Nursery Plants* (2014), *available at* http://switchboard.nrdc.org/blogs/jsass/home_depot_and_bjs_wholesale_c.html.

habitats, checking labels and avoiding neonicotinoid-ridden plants, and possibly even supporting bee hives of their own. The more the public presses forward in their refusal to use neonicotinoids, the more change will come.

## IV. CONCLUSION

As it currently stands, our government and laws have provided inadequate protection for our pollinators. In 2013, several countries imposed a two-year restriction on the use of several neonicotinoids, concluding that these pesticides pose "high acute risks" for bees.[116] Meanwhile, the United States is stalling. The EPA estimates it will be 2018 before it makes a decision on this deadly class of pesticides.[117] As New York beekeeper Jim Doan said, "Beekeepers are losing colonies at an unprecedented rate – the losses are too extreme to keep up with, and our entire industry is at risk of collapse unless federal action is taken. Convening conferences and changing pesticide labels is lip service and window dressing to the issue, but has no substance."[118]

Considering these grave consequences and the availability of practical alternatives, a regulation banning the sale and use of neonicotinoids is necessary to combat CCD. In the alternative, modifying applicator licensing plans to include education on local ecological issues and safer alternatives, allowing a private right of action, and mandating labeling or banning of neonicotinoids from consumer shelves, are a start to creating a better system to protect our bees.

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[116] *Start of EU Moratorium on Neonicotinoids Puts Focus on US EPA Inaction*, BEYOND PESTICIDES (Dec. 3, 2013), *available at* http://www.beyondpesticides.org/dailynewsblog/?p=12338.
[117] *Id*.
[118] *Id*.