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Marijuana and Legalization Impacts

Kevin Sabet, Ph.D.*

In 2012, Colorado and Washington voters passed referenda legalizing marijuana, accelerating the growth of a multibillion-dollar, addiction-for-profit industry, and causing negative impacts both inside and outside of those states. This paper describes some of the more salient impacts and highlights impaired driving issues, drug use prevalence, crime, and related issues in the context of state's rights and the gateway to other drugs.

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INTRODUCTION

In 2012, Colorado and Washington voters passed referendums legalizing marijuana, accelerating the growth of a multibillion dollar, addiction-for-profit industry, and causing negative impacts both inside and outside of those states. We now have five years of data, lessons learned, and negative impacts affecting both families and communities. In 2014, Oregon and Alaska legalized recreational marijuana production, sales, and possession. The District of Columbia legalized marijuana

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growing and possession in 2014 as well. The legalization of recreational sales has enabled the mass commercialization of high-potency products as financiers, entrepreneurs, and large companies have seized upon the opportunity to profit from customers dependent on an addictive product. The market has transitioned from marijuana for smoking to attractively packaged candies, gummies, and other edibles. Crystalline concentrates are now available with up to ninety-nine percent tetrahydrocannabinolic acid (THC-A), the precursor to the active component in cannabis.¹

One goal of the industry is to successfully convert young, casual users into heavy, more frequent users. Given this nation's addiction epidemic—deaths driven largely by opioids—the rise of lax legalization policies comes at an especially inopportune time. In the time that the opioid epidemic has increased, the percentage of marijuana users who are using the drug frequently has skyrocketed. For example, only 3.9 million Americans reported using marijuana twenty-one to thirty-one days a month in 1979, but that figure increased to 7.8 million Americans in 2014.² In addition, peer-reviewed research has revealed that 44.7% of lifetime cannabis users go on to use other illicit drugs at some point in their lives and that cannabis use is strongly associated with subsequent onset of opioid use disorder.³

Although the full picture resulting from legalization will not be clear for decades, we need not wait that long to understand some key consequences. In 2013, the U.S. Department of Justice (DOJ) decided to take a hands-off approach toward legalization at the state level. Officially, the DOJ stated it would only get involved if any of the eight requirements laid out in the Cole Memo were violated (for example, sales to minors or increases in drugged driving). In 2015, the U.S. Government Accountability Office issued a report recommending that the Attorney General direct the DOJ to document key aspects of its monitoring process for these violations, concluding that “DOJ has not documented its plan for monitoring the effects of state marijuana

¹ *We Tried 99 Percent THC-A Crystalline Dabs, and It Was Chill*, KINDLAND (Aug. 20, 2016), <https://www.thekindland.com/products/we-tried-99-percent-thc-a-crystalline-dabs-and-it-1983>.

² *Drug Legalization: A False Hope*, INST. FOR BEHAVIOR AND HEALTH, <https://www.ibhinc.org/drug-legalization/> (last visited Mar. 10, 2018).

³ Roberto Secades-Villa et al., *Probability and Predictors of the Cannabis Gateway Effect: A National Study*, 26 INT'L J. DRUG POL'Y 135 (2015); Mark Olfson et al., *Cannabis Use and Risk of Prescription Opioid Use Disorder in the United States*, 175 AM. J. PSYCHIATRY 47 (2017).

legalization.”⁴ However, public health and safety departments and law enforcement agencies in the states where legalization has been in place the longest have produced primary data and impact reports that shine a light on how current marijuana policies inadequately protect the health of the general population, especially with respect to traffic crashes. In Washington, driving under the influence of marijuana has contributed to a higher number of fatal traffic crashes. In Colorado, marijuana-related traffic deaths have increased sixty-six percent in the four years since marijuana was legalized in the state, as compared to a sixteen percent increase in all traffic deaths during the same time period. In two surveys of adult marijuana users in Oregon, twenty-one and thirty-four percent of the respective participants reported having driven within three hours of their marijuana use.⁵

In 2018, guidance from the DOJ returned to pre-Cole Memo policies, signaling uncertainty for the future of the marijuana industry. Despite state votes, marijuana remains illegal at the federal level and state actors violating federal law are committing felonies and risking significant consequences.

I. MARIJUANA: A BACKGROUND ON THE “GATEWAY” EFFECT

Though most people who try marijuana will not go on to use other illicit drugs, more than four in ten lifetime marijuana users will, according to a recent study of a nationally representative sample of 6624 U.S. adults.⁶ The Center for Disease Control also suggests that marijuana addicts are three times more likely than non-addicts to become addicted to heroin.⁷ Contrary to popular belief, however, relief from pain is not a strong determinant of cannabis use among adults.⁸ A more interesting question than “do marijuana users go on to use other drugs?” is “what is the mechanism by which a large number of marijuana users will go on to use other drugs?” The answer to that

⁴ U.S. GOV’T ACCOUNTABILITY OFFICE, DOJ SHOULD DOCUMENT ITS APPROACH TO MONITORING THE EFFECTS OF LEGALIZATION 39 (2005).

⁵ DAVE RODRIGUEZ, NORTHWEST HIGH INTENSITY DRUG TRAFFICKING AREA, WASHINGTON STATE MARIJUANA IMPACT REPORT 134 (2016); ROCKY MOUNTAIN HIGH INTENSITY DRUG TRAFFICKING AREA, THE LEGALIZATION OF MARIJUANA IN COLORADO: THE IMPACT 13 (2017); OREGON HEALTH AUTHORITY, MARIJUANA USE, ATTITUDES AND HEALTH EFFECTS IN OREGON vii (2016).

⁶ Secades-Villa et al., *supra* note 3.

⁷ *Today’s Heroin Epidemic Infographics*, CTR. FOR DISEASE CONTROL AND PREVENTION (July 7, 2015), <https://www.cdc.gov/vitalsigns/heroin/infographic.html>.

⁸ Olfson et al., *supra* note 3.

question is less clear.

According to the seminal 2017 National Academy of Sciences report, “[t]here is moderate evidence of a statistical association between cannabis use and the development of substance dependence and/or a substance abuse disorder for substances including alcohol, tobacco, and other illicit drugs.”⁹ Recent studies with animals also indicate that marijuana use is connected to use and abuse of other drugs. A 2007 study found that rats given tetrahydrocannabinol (THC) later self-administered heroin in addition to the dose of heroin they were already given, while those rats that had not been treated with THC did not self-administer heroin.¹⁰ Authors concluded that “the current findings support the gateway hypothesis demonstrating that adolescence cannabis exposure has an enduring impact on hedonic processing resulting in enhanced opiate intake, possibly as a consequence of alterations in limbic opioid neuronal populations.”

Another study found that adolescent THC exposure in rats seemed to affect the rodents’ brain maturation, as they subsequently displayed “heroin-seeking” behavior.¹¹ Youth marijuana use thus could lead to “increased vulnerability to drug relapse in adulthood.”¹²

The National Institutes of Health states that research in this area is “consistent with animal experiments showing THC’s ability to ‘prime’ the brain for enhanced responses to other drugs. For example, rats previously administered THC show heightened behavioral response not only when further exposed to THC, but also when exposed to other drugs such as morphine—a phenomenon called cross-sensitization.”¹³

Furthermore, the National Academy of Sciences report found that “with regard to opioids, cannabis use predicted continued opioid prescriptions 1 year after injury.”¹⁴ Finally, cannabis use was associated with reduced odds of achieving abstinence from alcohol, cocaine, or polysubstance use after inpatient hospitalization and treatment for

⁹ NAT’L ACADS. OF SCIS., ENGINEERING, & MED., *THE HEALTH EFFECTS OF CANNABIS AND CANNABINOIDS* 21 (Robert Pool ed., 2017).

¹⁰ Maria Ellgren et al., *Adolescent Cannabis Exposure Alters Opiate Intake and Opioid Limbic Neuronal Populations in Adult Rats*, 32 *NEUROPSYCHOPHARMACOLOGY* 607 (2007).

¹¹ Serena Stopponi et al., *Chronic THC During Adolescence Increases the Vulnerability to Stress-Induced Relapse to Heroin Seeking in Adult Rats*, 24 *EUR. NEUROPSYCHOPHARMACOLOGY* 1037, 1038 (2014).

¹² *Id.* at Abstract.

¹³ NAT’L INST. ON DRUG ABUSE, *MARIJUANA* 20–21 (2017).

¹⁴ NAT’L ACADS. OF SCIS., *supra* note 9, at 365.

substance use disorders.¹⁵

Moreover, a three-year 2016 study of adults also found that marijuana use is associated with increased risk of the onset or persistence of alcohol use disorders.¹⁶ Those who reported marijuana use during the first wave of the survey were more likely than adults who did not use marijuana to develop an alcohol use disorder within three years. Similarly, alcohol consumption in Colorado has increased by five percent since legalization.¹⁷

II. DRUG POLICY: STATE RIGHTS VERSUS FEDERALISM

A concept growing in popularity is the idea of marijuana policy as a “states’ rights” issue versus one for the federal government; however, drug policy falls under Congress’s power to regulate interstate commerce.¹⁸

States that have legalized marijuana have affected neighboring states where marijuana is still illegal. Nebraska and Oklahoma have sued Colorado for increasing the flow of marijuana into their territories.¹⁹ Moreover, this issue has already been settled by the courts. In *Gonzales v. Raich*, a 2005 case regarding federal enforcement of laws concerning marijuana plants in someone’s yard, the Supreme Court ruled six to three that federal law supersedes state law in enforcing drug statutes—even in states where marijuana is legal.²⁰

A draft assessment of the state’s legal marketplace from Oregon State Police estimated that the legal marijuana market makes up only thirty percent of the entire marijuana market in the state.²¹ And a local Denver news channel notes that legalization “has inadvertently helped

¹⁵ *Id.*

¹⁶ Andrea H. Weinberger et al., *Is Cannabis Use Associated with an Increased Risk of Onset and Persistence of Alcohol Use Disorders? A Three-Year Prospective Study Among Adults in the United States*, 161 *DRUG & ALCOHOL DEPENDENCE* 363 (2016).

¹⁷ ROCKY MOUNTAIN HIGH INTENSITY DRUG TRAFFICKING AREA, *supra* note 5, at 150.

¹⁸ See *Gonzales v. Raich*, 545 U.S. 1 (2005).

¹⁹ John Ingold, *Nebraska and Oklahoma Sue Colorado Over Marijuana Legalization*, DENVER POST (Oct. 2, 2016), <http://www.denverpost.com/2014/12/18/nebraska-and-oklahoma-sue-colorado-over-marijuana-legalization/>.

²⁰ *Gonzales*, 545 U.S. at 9.

²¹ Trevor Hughes, *Marijuana’s Legalization Fuels Black Market in Other States*, USA TODAY (Aug. 1, 2017), <https://www.usatoday.com/story/news/nation/2017/07/31/marijuana-black-market/507417001/>.

fuel the business of Mexican drug cartels.”²² According to Jorge Duque with the Colorado Department of Law, “cartels are now trading drugs like heroin for marijuana.”²³ A special media investigation revealed in 2018 that a record number of packages were mailed to or from Colorado through the U.S. Postal Service, up to 934 from 805.²⁴ The number was 234 in 2012.

The U.S. mail system has also been affected by the black market, seeing an 844% increase in the number of seized parcels containing Colorado marijuana over the past four years.²⁵ Narcotics officers in Colorado have been busy responding to the fifty percent increase in illegal growing operations across rural areas in the state.²⁶

Legalization has made it easier for the black market to thrive in rural areas due to the difficulties involved in distinguishing between legal and criminal marijuana farms. About \$6.5 million worth of illegal marijuana was confiscated by federal agencies in the White River National Forest in Aspen, Colorado, and 9200 illegal marijuana plants were found growing on islands in the middle of the Colorado River.²⁷ The ability to hide black market activity in legalized states has encouraged drug trafficking organizations (DTOs) and Mexican cartels to begin growing marijuana illegally within the United States, and there is now a strong presence of cartel activity in Alaska.²⁸

²² Sally Mamdooh, *Mexican Drug Cartels Are Taking Full Advantage of Colorado's Marijuana Laws*, DENVER CHANNEL (Apr. 7, 2016), <https://www.thedenverchannel.com/news/local-news/marijuana/mexican-drug-cartels-are-taking-full-advantage-of-colorados-marijuana-laws>.

²³ *Id.*

²⁴ Jace Larson, *Record Number of Mailed Marijuana Packages Caught by Feds in Colorado Last Year*, DENVER CHANNEL (Feb. 8, 2018), <https://www.thedenverchannel.com/news/investigations/record-number-of-mailed-marijuana-packages-caught-by-feds-in-colorado-last-year>.

²⁵ ROCKY MOUNTAIN HIGH INTENSITY DRUG TRAFFICKING AREA, *supra* note 5, at 109.

²⁶ Marc Stewart, *Rural Marijuana Grows Rising in the State of Colorado*, DENVER NEWS (Sept. 27, 2017), <https://www.thedenverchannel.com/news/local-news/marijuana/rural-marijuana-grows-rising-in-the-state-of-colorado>.

²⁷ *Federal Agencies Raid Pot Grow Operation in Aspen*, ASSOCIATED PRESS (Sept. 29, 2017), <https://www.usnews.com/news/best-states/colorado/articles/2017-09-29/federal-agencies-raid-pot-grow-operation-in-aspen-area>; Anusha Roy, *Marijuana Grow Found on Two Islands in the Colorado River*, 9NEWS.COM (Sept. 7, 2017), <http://www.9news.com/article/news/crime/marijuana-grow-found-on-two-islands-in-the-colorado-river/472187162>.

²⁸ See Johnny Magdaleno, *Mexican Drug Cartels May Use Illegal Marijuana to Increase Their Presence in Northern California*, NEWSWEEK (Jan. 10, 2018), <http://www.newsweek.com/2018/01/19/mexican-drug-cartels-taking-over-california->

The United States Attorney in Oregon reported in 2018 that “Oregon has a massive marijuana overproduction problem,” with 2644 pounds of marijuana in outbound postal parcels and over \$1.2 million in cash seized in 2017 alone.²⁹ In the last half of 2017, one million dollars in cash linked to marijuana transactions was seized at Portland International Airport.³⁰ Law enforcement across sixteen states have reported marijuana seizures coming from Oregon.³¹ Lancaster County sheriff’s deputies in Nebraska arrested a licensed marijuana processor from Oregon who was intending to distribute the 110 pounds of raw marijuana and twenty-five pounds of shatter (super high potency THC wax) in his vehicle.³²

III. MARIJUANA-RELATED CRIME AND OFFENSES SINCE LEGALIZATION

Apart from black market activity, legalization has potentially exacerbated other crimes as well. Though it cannot be said that crime has increased because of legalization, some trends are worth noting. The crime rate in Colorado has increased eleven times faster than the 0.3 % average increase reported in the thirty largest cities in the nation since legalization,³³ with the Colorado Bureau of Investigation reporting an 8.3% increase in property crimes and 18.6% increase in violent crimes.³⁴ Along with the increase in property crimes, the Boulder Police Department has reported an increase in marijuana public consumption

legal-marijuana-775665.html; ALASKA DEP’T OF PUB. SAFETY, UNIFORM CRIME REPORTS, 2014–2016 (2016).

²⁹ Billy J. Williams, *A Call For Transparency and Action on Marijuana*, OREGONLIVE.COM (Jan. 12, 2018), http://www.oregonlive.com/opinion/index.ssf/2018/01/us_attorney_a_call_for_transpa.html.

³⁰ *Id.*

³¹ *Id.*

³² Riley Johnson, *Oregon Pot Processor Arrested in Lincoln*, LINCOLN JOURNAL STAR (Nov. 9, 2017), http://journalstar.com/news/local/911/oregon-pot-processor-arrested-in-lincoln-after-m-in-cannabis/article_26e24d67-7ed1-52e2-b27c-a4b7a60f3db9.html.

³³ Kirk Mitchell, *Crime Rate in Colorado Increases Much Faster Than Rest of the Country*, DENVER POST (July 11, 2017), <https://www.denverpost.com/2017/07/11/colorado-sees-big-increase-crime-10-percent-higher-murder-rate/>.

³⁴ COLORADO BUREAU OF INVESTIGATION, NATIONAL UNIFORM CRIME REPORTS (2017) (quoting ROCKY MOUNTAIN HIGH INTENSITY DRUG TRAFFICKING AREA, *supra* note 5, at 118).

citations since legalization.³⁵

According to Alaska law enforcement reports, misdemeanor and vehicle thefts have dramatically increased since legalization. Alaska saw nine hundred more burglaries and 2533 more larcenies in 2016 than in 2014, when marijuana became legal.³⁶ Since legalization in 2014 and 2016, Oregon's national ranking rose from seventeenth to eleventh for property crime, twelfth to seventh for larceny, and thirteenth to eighth for motor vehicle theft.³⁷

A link between looser laws and crime has been explored in the scientific literature. A study funded by the National Institutes of Health (NIH) showed that the density of marijuana dispensaries was linked to increased property crimes in nearby areas.³⁸ Researchers found that Denver, Colorado, neighborhoods adjacent to marijuana businesses saw eighty-four more property crimes each year than neighborhoods without a marijuana shop nearby.³⁹

Many young people hear the message that "pot is legal" but are unaware (or unconcerned) that its public use is not. In Anchorage, school suspensions for marijuana increased more than 141% from 2015 to 2017, after legalization was implemented.⁴⁰ "Because it's legal in the community, I think, the stigma around marijuana use is decreasing," said Joe Zawodny, director of secondary education for the school district.⁴¹ "The data would seem to say there is increasing use."⁴² Since 2012, the percentage of Colorado marijuana-related school incidents that were reported to law enforcement has increased to twenty-three percent.⁴³

A permissive attitude among those in the marijuana industry has also contributed to a rise in selling marijuana to minors. As of

³⁵ ROCKY MOUNTAIN HIGH INTENSITY DRUG TRAFFICKING AREA, *supra* note 5, at 121.

³⁶ ALASKA DEP'T OF PUB. SAFETY, *supra* note 28.

³⁷ UNIFORM CRIME REPORTING DISASTER CTR., OREGON CRIME RATES 1960–2015 (2015), <http://www.disastercenter.com/crime/orcrime.htm>.

³⁸ Bridget Freisthler et al., *From Medical to Recreational Marijuana Sales: Marijuana Outlets and Crime in an Era of Changing Marijuana Legislation*, 2017 J. PRIMARY PREVENTION 249, 258 (2017).

³⁹ *Id.*

⁴⁰ Charles Wohlforth, *Marijuana School Suspensions More than Doubled After Legalization*, ANCHORAGE DAILY NEWS (Jan. 11, 2018), <https://www.adn.com/opinions/2018/01/11/marijuana-school-suspensions-more-than-doubled-after-legalization/>.

⁴¹ *Id.*

⁴² *Id.*

⁴³ ERNESTO MUNOZ ET AL., COLO. DEP'T OF PUB. SAFETY, SUMMARY OF LAW ENFORCEMENT AND DISTRICT ATTORNEY REPORTS OF STUDENT CONTACTS 20 (2017).

September 2017, Washington law enforcement has documented a total of 424 violations among licensed marijuana businesses: 288 violations pertained to selling marijuana to minors and 136 violations were for allowing minors access to a restricted area.⁴⁴ In December 2017, the Oregon Liquor Control Commission conducted a random inspection of sixty-six licensed marijuana retailers and found that sixteen of the businesses were selling marijuana to minors.⁴⁵ Diversion to minors also contributes to a significant portion of marijuana addiction treatment admissions. A study in Colorado found that about fifty percent of youth in outpatient substance-abuse treatment reported using diverted “legal” marijuana.⁴⁶

IV. IMPACTS OF LEGALIZATION ON COMMUNITIES OF COLOR

As pro-marijuana lobbyists argue that marijuana legalization will increase social justice in legalized states, disparities among use and criminal offense rates continue among race, ethnicity, and income levels. The District of Columbia saw public consumption nearly triple between the years 2015 and 2016, and a disproportionate number of those marijuana-related arrests occur among African Americans.⁴⁷

Colorado has seen a similar trend among its student population with the number of marijuana-related offenses in schools linked to the proportion of youth of color enrolled. Colorado schools that had twenty-five percent or fewer youth of color had 313 marijuana-related suspensions compared to 658 marijuana-related suspensions for schools comprised of populations with seventy-six percent or more youth of color.⁴⁸

⁴⁴ WASHINGTON STATE LIQUOR AND CANNABIS BD., ENFORCEMENT AND COMPLIANCE DATA (2017).

⁴⁵ *Licensees Across Oregon Fail to Stop Sales to Minors*, SUPERTALKRADIO.COM (Jan. 10, 2018), <http://supertalkradio.com/news/licensees-across-oregon-fail-to-stop-sales-to-minors/>.

⁴⁶ S. Wilkinson et al., *Marijuana Legalization: Impact on Physicians and Public Health*, 67 ANN. REV. OF MED., 453, 453–66 (2017).

⁴⁷ D.C. METRO. POLICE DEP'T, MARIJUANA POSSESSION ARREST BY RACE/ETHNICITY 2012 THROUGH JULY 26, 2015 (2016); Justin Moyer, *DC Arrests for Public Use of Marijuana Nearly Tripled Last Year*, WASH. POST (July 11, 2017), https://www.washingtonpost.com/local/public-safety/dc-arrests-for-public-use-of-marijuana-nearly-tripled-last-year/2017/07/11/906bea50-627d-11e7-8b2b-b6c8c99c3bea_story.html?utm_term=.6f023f47928c.

⁴⁸ COLORADO DEP'T OF PUB. SAFETY, MARIJUANA LEGALIZATION IN COLORADO: EARLY FINDING (2017).

Furthermore, juvenile marijuana-related arrests have increased among African American and Hispanic teens in Colorado after legalization. Between 2012 and 2014, the percentage of Hispanic and African American arrests for teens under eighteen years old increased to twenty-nine percent and fifty-eight percent, respectively.⁴⁹ With the advent of legalization, communities of color are subject to disproportionate targeting by marijuana facilities. In Los Angeles, the majority of dispensaries have opened primarily in African American communities.⁵⁰ An overlay of socioeconomic data with the geographic location of pot shops in Denver shows marijuana stores are located primarily in disadvantaged neighborhoods.

Marijuana legalization has touched on issues related to vulnerable populations. In Colorado, those with a household income below \$25,000 had a twenty percent current-use rate compared to an eleven percent rate among households with income levels of \$50,000 or greater.⁵¹ In a study of one hundred women living in low-income areas, fourteen percent tested positive for marijuana use in the past three weeks by urinalysis test and twenty-eight percent tested positive for use in the past three months by hair testing.⁵² Citing another study, the American College of Obstetricians and Gynecologists reported that noted that “18.1% of pregnant women reporting marijuana use in the past year met criteria for marijuana abuse, or dependence, or both.”⁵³

V. IMPACT OF LEGALIZATION ON HOMELESSNESS

The easy availability of marijuana after legalization also appears to have a possible link to Colorado’s growing homeless population. While overall U.S. homelessness decreased between 2013 and 2014 as the country moved out of the recession, Colorado was one of seventeen

⁴⁹ *Id.*

⁵⁰ C. Thomas & B. Freisthler, *Evaluating the Change in Medical Marijuana Dispensary Locations in Los Angeles Following the Passage of Local Legislation*, J. OF PRIMARY PREVENTION (2017).

⁵¹ COLORADO DEP’T OF PUB. SAFETY, *supra* note 48.

⁵² Jessica Beatty, et al., *Prevalence and Perceived Financial Costs of Marijuana versus Tobacco Use among Urban Low-Income Pregnant Women*, 3 J. OF ADDICTION RES. & THERAPY 1, 4 (2012).

⁵³ AM. C. OF OBSTETRICIANS & GYNECOLOGISTS, ACOG COMMITTEE OPINION NUMBER 722 (2017) (citing Jean Y. Ko et al., *Prevalence and Patterns of Marijuana Use Among Pregnant and Nonpregnant Women of Reproductive Age*, 213 AM. J. OF OBSTETRICS & GYNECOLOGY 201.e5 (Aug. 2015) (finding that the 11.4% of the nonpregnant population met the same abuse/dependence criteria)).

states that saw homeless numbers increase during that time.⁵⁴ Perhaps not coincidentally, it was also when Colorado legalized “recreational-use” marijuana and allowed retail sales to begin. The U.S. Department of Housing and Urban Development reported a thirteen percent increase in Colorado’s homeless population from 2015 and 2016, though the rest of the country saw a three percent decrease in homelessness.⁵⁵ One media report found the resort town of Durango, Colorado, “suddenly became a haven for recreational pot users, drawing in transients, panhandlers, and a large number of homeless drug addicts.”⁵⁶

VI. IMPACT OF LEGALIZATION ON THE ENVIRONMENT

Legalization and the industry it created have caused irreparable damage to rainforests and other elements of the ecosystem. In California, farms generating marijuana crops have polluted plants and other natural life to the point of being hazardous to surrounding communities.⁵⁷ For example, pollution caused by illegal grow sites has inflicted animal casualties. The poison used to reduce rodent population on farms has in turn killed large numbers of spotted owls, a species marked as “threatened” according to the Endangered Species Act.⁵⁸ The full effects of the industry on the natural environment are only beginning to be recognized. These impacts occur even under a so-called “regulated” environment, as the vast amounts of water and electricity needed to power marijuana farms are damaging to the environment.

Because the black market for marijuana in legalized states like Colorado has not abated, abuse and degradation of public lands from illegal grows continues.⁵⁹ For example, in 2015 the DOJ announced a

⁵⁴ Alicia Acuna, *Colorado tries to fight homeless problem that may have been triggered by pot law*, FOX NEWS (July 10, 2017), <http://www.foxnews.com/us/2017/07/10/colorado-tries-to-fight-homeless-problem-that-may-have-been-triggered-by-pot-law.html>.

⁵⁵ *Id.*

⁵⁶ Joseph J. Kolb, *Legalized Marijuana Turns Colorado Resort Town into Homeless Magnet*, FOX NEWS (May 17, 2017), <http://www.foxnews.com/us/2017/05/17/legalized-marijuana-turns-colorado-resort-town-into-homeless-magnet.html>.

⁵⁷ Sharon Bernstein, *Toxic Waste from U.S. Pot Farms Alarms Experts*, REUTERS (Aug. 6, 2017), <https://www.reuters.com/article/us-usa-marijuana-environment/toxic-waste-from-u-s-pot-farms-alarms-experts-idUSKBN1AM0C3>.

⁵⁸ Jasmin Malik Chua, *Owls Dying near Marijuana Farms (Here’s Why)*, LIVE SCIENCE (Jan. 11, 2018), https://www.livescience.com/61403-marijuana-farms-dying-owls.html?utm_source=ls-newsletter&utm_medium=email&utm_campaign=20180117-ls.

⁵⁹ Editorial, *Special Report, ‘Clearing the Haze:’ Black Market is Thriving in*

wave of prosecutions on federal land resulting in seizure of twenty thousand marijuana plants and more than three hundred kilograms of dried marijuana in Colorado. Suspects included Cuban nationals “acting in an organized manner.”⁶⁰ In 2017, four years after Colorado legalized pot, officials found more than seven thousand illegal plants on federal land in the San Isabel National Forest. It was the fifth illegal grow found in that area since the year legalization passed.⁶¹

Power consumption is a similar story. In 2012, marijuana growing consumed an estimated one percent of the nation’s electricity, and since that time marijuana cultivation has expanded significantly.⁶² That is six times the amount of power the entire U.S. pharmaceutical industry uses and it can be expected to rise if cultivation and consumption continues to escalate due to legalization.⁶³ The energy to produce a single joint emits three pounds of carbon dioxide, which is comparable to leaving a TV on for over fifteen hours.⁶⁴ This enormous energy use derives from both the quantity of marijuana grown and the large amount of energy it demands when grown indoors. When considering a product’s “‘efficiency’ as how much energy is required to generate economic value,” marijuana energy intensity is measured as about “20 MJ per thousand dollars of shipment value (wholesale price)” compared to petroleum and coal (about 6). According to the founder of the Resource Innovation Institute, a Portland- based nonprofit,

Colorado, GAZETTE (Colo. Springs) (Mar. 20, 2015), <http://gazette.com/special-report-clearing-the-haze-black-market-is-thriving-in-colorado/article/1548305>; see also David O. Williams, *Collateral Impact: Illegal Marijuana is Spreading on Public Lands—Here’s What’s Concerning Officials*, GAZETTE (Colo. Springs) (Apr. 16, 2018), http://gazette.com/illegal-marijuana-is-spreading-on-public-landsheres-whats-concerning-officials/article/1624408#cxrecs_s.

⁶⁰ U.S. Att’y Office, District of Colorado, *Confronting Wave of Illicit Marijuana Cultivation, Federal, State and Local Authorities Discover and Destroy Major Marijuana Grows in Locations Across Colorado*, U.S. DEP’T OF JUSTICE (Oct. 8, 2015), <https://www.justice.gov/usao-co/pr/confronting-wave-illicit-marijuana-cultivation-federal-state-and-local-authorities>.

⁶¹ Kieran Nicholson, *Hiker Finds Illegal Marijuana Grows Worth \$7 Million in San Isabel National Forest*, DENVER POST (June 30, 2017), <https://www.denverpost.com/2017/06/30/illegal-marijuana-grow-san-isabel-national-forest/>.

⁶² See Evan Mills, *The Carbon Footprint of Indoor Cannabis Production*, 46 ENERGY POL’Y 58, 59 (2012).

⁶³ *Id.*

⁶⁴ Agence France-Presse, *Everyday Actions that Contribute to Carbon Dioxide Emissions*, ABS-CBN NEWS (Nov. 27, 2015), <http://news.abs-cbn.com/focus/11/27/15/everyday-actions-that-contribute-to-carbon-dioxide-emissions>.

cultivation uses so much power that indoor marijuana “production in Colorado is responsible for 2% of the state’s electrical load and 45% of all new electricity demand coming online.”⁶⁵ *Mother Jones* magazine also indicated that the marijuana market “has placed a huge burden on the grid that distributes electricity throughout the state.”⁶⁶

VII. IMPACT OF LEGALIZATION ON THE WORKFORCE

Marijuana legalization has had serious ramifications for businesses across legalized states. Increased marijuana availability and use has also increased the number of employees testing positive for marijuana in the workforce. In the three-year period following legalization in Colorado and Washington (2013 to 2016), positive oral-fluid test results for marijuana use increased by almost seventy-five percent, from 5.1% to 8.9%.⁶⁷ Marijuana urine test results in Washington and Colorado are now double the national average.⁶⁸ This growing demand for marijuana has made it difficult to find employees who can pass a pre-employment drug test. Colorado construction company GE Johnson was forced to hire out-of-state construction workers because too many Coloradans were failing pre-employment drug tests.⁶⁹

A study conducted in Washington covering 2011 through 2014 found that the percentage of work-related injuries and illnesses was significantly higher (8.9%) among marijuana users than non-users.⁷⁰ Insurance claims have become a growing concern among companies in legalized states because if marijuana use is allowed or drug testing ignored, employers are at risk of liability claims when a marijuana-

⁶⁵ Mills, *supra* note 62, at 62.

⁶⁶ Brentin Mock, *This is How Much Energy It Takes to Legalize Weed*, MOTHER JONES (July 8, 2015), <https://www.motherjones.com/environment/2015/07/marijuana-energy-denver/>.

⁶⁷ *Increases in Illicit Drugs, Including Cocaine, Drive Workforce Drug Positivity to Highest Rate in 12 Years*, QUEST DIAGNOSTIC, <http://newsroom.questdiagnostics.com/2017-05-16-Increases-in-Illicit-Drugs-Including-Cocaine-Drive-Workforce-Drug-Positivity-to-Highest-Rate-in-12-Years-Quest-Diagnostics-Analysis-Finds>.

⁶⁸ *Id.*

⁶⁹ *Drug Use a Problem for Employers*, GAZETTE (Colo. Springs) (Mar. 24, 2015), <http://gazette.com/drug-use-a-problem-for-employers/article/1548427>.

⁷⁰ Jennifer L. Marcum, et al., *Self-reported Work-related Injury or Illness—Washington, 2011–2014*, 66 CDC MORBIDITY & MORTALITY WEEKLY REPORT 302 (2017) (where non-users experienced illness and injury at a rate of 6.1%).

related injury or illness occurs onsite.⁷¹ The issue is further complicated by pro-marijuana advocates who are pushing to eliminate workplace drug-testing policies.

VIII. DRUGGED DRIVING

Drugged driving and motor vehicle fatalities have increased in several states that have legalized recreational marijuana. Fatal crashes involving drivers who recently used marijuana doubled in Washington after the state legalized the drug, according to the latest research by the AAA Foundation for Traffic Safety.⁷² The percentage of marijuana offenses among those driving under the influence of drugs (DUIDs) has also risen in Colorado, with seventy-six percent of statewide DUIDs involving marijuana in 2016.⁷³ When Driving Under the Influence (DUI) offenses are included, the percentage involving marijuana is seventeen percent, a twenty-eight percent increase between 2012 and 2016.⁷⁴ In Oregon, fifty percent of all drivers assessed by Drug Recognition Experts in 2015 were assessed as cannabis-impaired.⁷⁵ Toxicology reports show that the rate of drivers testing positive for THC has increased at a consistent rate since 2013, resulting in an increase in THC-related impaired driving.⁷⁶ Unfortunately, Alaska does not have

⁷¹ George C. Hlavac & Edward J. Easterly, *Legal Issues: Marijuana in the Workplace*, NAT'L ASS'N OF COLLS. AND EMPLOYERS (Feb. 1, 2016), <http://www.nacweb.org/public-policy-and-legal/legal-issues/legal-issues-marijuana-in-the-workplace/>.

⁷² Brian C. Tefft et al., AAA FOUNDATION FOR TRAFFIC SAFETY, PREVALENCE OF MARIJUANA INVOLVEMENT IN FATAL CRASHES: WASHINGTON, 2010–2014 (May 2016), <http://publicaffairsresources.aaa.biz/wp-content/uploads/2016/04/Prevalence-of-Marijuana-Involvement-Report-FINAL.pdf>.

⁷³ ROCKY MOUNTAIN HIGH INTENSITY DRUG TRAFFICKING AREA, *supra* note 5, at 13.

⁷⁴ *Id.* at 25.

⁷⁵ OREGON HEALTH AUTHORITY, MARIJUANA REPORT 62 (2016), <https://digital.osl.state.or.us/islandora/object/osl%3A95678/datastream/OBJ/view>. A Drug Recognition Expert (DRE) is a police officer trained specifically to “recognize impairment in drivers under the influence of drugs other than, or in addition to, alcohol.” All fifty states and the District of Columbia participate in the Drug Evaluation and Classification Program that trains DREs. Oregon State Police, *Oregon Drug Evaluation & Classification Program (DECP)*, OREGON.GOV, <http://www.oregon.gov/osp/PATROL/Pages/DRE-Program.aspx> (last visited Apr. 18, 2018).

⁷⁶ OREGON LIQUOR CONTROL COMM'N, 2015 HOUSE BILL 3400 DUI LEGISLATIVE REPORT, at 5, (Dec. 30, 2016), http://www.oregon.gov/olcc/marijuana/Documents/HB3400_2015_DUIILegislativeReport.pdf.

reliable DUID data available.

In many states where marijuana is legalized, collision claims have increased.⁷⁷ The number of drivers in Colorado intoxicated with marijuana and involved in fatal traffic crashes increased eighty-eight percent from 2013 to 2015, and marijuana-related traffic deaths increased sixty-six percent between the four-year averages before and after legalization.⁷⁸

CONCLUSION

It is too early to offer a final ruling on the effects of legalization, but early indicators should give us pause. Statistics presented from states such as Colorado, Washington, and Alaska show positive correlations between marijuana legalization and increased crime and illicit drug use, as well as negative environmental impacts. In part because many laypersons who now use marijuana do not fully understand the limits of marijuana laws—and the fact that public use is still not legal—legalization has also had disparate impact in offense rates among minority communities. Further, media investigations and peer-reviewed studies suggest an impact on homelessness, drug-testing for work purposes, and motor vehicle crashes. More research is necessary to understand the causative impacts of marijuana legalization in these areas. At the very least, the public and lawmakers should be aware of the negative effects of today's highly potent marijuana.

⁷⁷ *Studies Link Legalized Use of Recreational Marijuana with Increase in Crashes*, INSURANCE INST. FOR HIGHWAY SAFETY & HIGHWAY LOSS DATA INST. (Aug. 3, 2017), <http://www.iihs.org/iihs/sr/statusreport/article/52/5/3>; David Migoya, *Exclusive: Traffic Fatalities Linked to Marijuana Are Up Sharply in Colorado; Is Legalization to Blame?*, DENVER POST (Aug. 25, 2017), <https://www.denverpost.com/2017/08/25/colorado-marijuana-traffic-fatalities/>.

⁷⁸ Migoya, *supra* note 77.