I'd like to offer another perspective on this agenda item that needs to be taken into consideration. You can Debate Local Politics on Mr. McCarty's Facebook page until the cows come home, but you can't argue with the facts. The McCarty's have censored, defamed, and gaslighted me on social media for having the temerity to exercise my moral and civic duty to expose the works of darkness to the light of Truth. It is apparent these cannabis growers lack the character and integrity to be good citizens, much less good neighbors.

First of all, it is a fact that two Planning Commissioners, Andy Nevis and Kris Payne, have unethically used their positions as officers of the Taxpayers Association for their own purposes. Bob Williams and Lexi Boeger are members of the Association. You may not be aware that Kevin McCarty is a director. Kevin colluded in secret tribunals with **Andy Nevis, Kris Payne, Lee Tannenbaum, Carol Louis**, and others, in retaliation against me for whistleblowing about their unlawful conduct which violated local, state, and federal laws. You also may not be aware of the retaliation behind the dismissal of Planning Commissioner Dr. Cheryl Bly-Chester for whistleblowing which culminated in a lawsuit at taxpayers' expense. Then the circumstances behind Commissioner Dan Harkin's removal should raise even more questions about how the the BOS and Commissioners unethically conduct business behind closed doors.

In yet another example, on June 15th Lee Tannenbaum texted me: *Kris has told me confidentially that he was told by George during the election to vote no on cannabis. Look at the Hardy hearing where Kris abstained with prejudice. It was his way of saying **f u to his orders**. He was fired right after that.*

I replied: *He was fired because I publicly filed formal complaints in front of the BOS and with HR. That's why he's retaliating against me for whistleblowing. The Hardy hearing was also simultaneous with my public complaints about Kris and Andy violating their oaths. When I read one of Kris's crazy rants into the public record in which he even admitting violating the Brown Act, Wendy Thomas shut off the mic on me. **HR doesn't like those kind of things going public.** Kris's award for service after he was dismissed as a Planning Commissioner was just a typical dust-up.*

Lastly, I share the same concerns that Leslie Schoenfeld brought to light about the CA Water Resources Control Board. As you heard earlier, Mr. Nevis is employed by the Water Resources Control Board. He has repeatedly violated his oaths of office and public policies which are grounds for displinary action. As such, Mr. Nevis has a conflict of interest, so he would be wise to recuse himself from this item. In fact, this entire agenda item deserves much more scrutiny and public transparency.

7/15/24 TPA:

Debating Local El Dorado County Politics (Uncensored)

Public group · 255 members

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Your profile been suspended in this group
The admin has temporarily turned off your ability to post, comment and earn contribution points in the group until July 29, 2024, 10:03 AM. Learn more

● ● ● ● Kevin McCarty

Melody, I have not responded to the various posts involving TPA because I did not think it worth the time, and perhaps it still isn't. At this point however I believe I have heard all your public grievances, on this page, at TPA meetings, and before the Board of Supervisors open forum segment. I speak only for myself, but I am sure that others will concur with the following assessment:

I have trouble identifying the original grievance behind your actions. Clearly there was something, but virtually all of your complaints are compounded consequences resulting from you not getting the audience and/or action that you wanted. If a public official did not listen to your concerns as a constituent, then I agree that is a problem. Collusion among public officials and partisan political operatives is also extremely concerning and should be addressed and rectified, by whatever means necessary. The right to free speech is sacred and no American citizen should be deprived of that blessing.

Having established that basis of agreement and sympathy, I frequently find your tactics to be asymmetrical, off-base, and irritating to the point of being self-defeating of your stated goals and purpose. TPA is not a government organization, and in its 501c classification, nobody has a right to participate in its proceedings. It is a privilege, plain and simple, and it can be granted and revoked at the discretion of the Board of Directors at any time.

Taking the manufactured drama that often finds expression at TPA meetings and airing it before our county Board of Supervisors is, in my opinion, a complete waste of everyone's time -- yours as petitioner, ours as residents, and the Board's as an elected body with plenty of important issues to deliberate that totally eclipse even the most egregious of items that you discuss, frequently and at times, ad nauseam.

Without a doubt, there is not a person on the face of this earth, not even Erin McCarty, with whom I find agreement 100% of the time on every issue. I certainly have agreements and disagreements of opinion with Mr. Payne and Mr. Nevis. You will find no defense of Todd White from me. He is, objectively, unredeemable as a human being. With that said, I believe you are right now treating Kris and Andy more unfairly than they have treated you at any point in time.

My understanding is that yes, you were a member of TPA as is the privilege open to any qualified resident of EDC who shares concern about the fiscal machinations of our local and State governments. As the result of your behavior at TPA meetings, willingly chosen as a human being endowed with free will, you were formally reprimanded, warned about potential membership termination for subsequent behavioral problems, and then ultimately terminated as a member of the organization in 2022.

Again, nobody has a right to be part of a private organization, and its operations are governed by Bylaws, not by the codes and statutes that bind public and elected officials. It is irrelevant to conflate the two domains and pretend that nonexistent rights have been violated, when it is fully within the norms of any organization to terminate association with disruptive members within its ranks who hinder its effectiveness.

If you have a personal issue with Kris or Andy, then seek an audience with them as individuals. But as for TPA, the matter is settled and as far as I can tell it will remain so until such time as the Board of Directors decides that your participation will be more of a help than a hindrance in achieving its mission and purpose. Each of these outbursts and airing of "dirty laundry" at meetings and BoS hearings, ensures that this outcome will remain remote, if even possible at all at this point.

TPA President Payne asked a question of you at Monday's meeting, moments after your disruption hijacked a deliberation of *private* business, which I find to be quite cogent, and cuts straight to the point of something that I also would like to know, with great curiosity. To paraphrase, "Why do you want so badly to be a member of an organization that you believe to be made up entirely of frauds?"

I hope, but am doubtful, that you will take this message as I intend it to be: sincere and constructive criticism of your methods, not necessarily you as a person. I applaud your intensity in seeking to enforce transparency and accountability among our local government, and believe that more people should be active in defending their God-given rights as Americans. To that extent, I remain receptive to your petitions.

I pray that you find peace enough to let go of grievances that cannot be resolved, either because they are ultimately insignificant or because they are greater than us as individual citizens and beyond our power to influence.

Be well, and have a good evening.

Melody Lane

Kevin McCarty Permit me to clear up some of your misperceptions and fallacies by reviewing a few facts that you may have overlooked. You are certainly entitled to your opinion, but you cannot argue with the facts, evidence and applicable law contained in the notarized affidavits which were responsible for getting Todd White removed from EDC employment, Big Brothers/Big Sisters, and Park Community Church where the RCC formerly held their monthly meetings. Planning Commissioner Kris Payne was also fired after I submitted formal complaints to HR concerning his perpetual violation of the the Brown Act and some of the same *LORS delineated within the Todd White affidavits. Andy Nevis received similar notifications of legal responsibility which is the first essential of due process of law. All are public records that were effective in the dismissal of Todd and Kris without the necessity of having to enter into costly litigation at the expense of taxpayers. I'm happy to have a face-to-face conversation with you to explain anything in those documents that you may not understand. Please note the following:

The TPA FB page states, "Providing a VOICE for El Dorado County taxpayers through advocacy, voter education, and weekly public meetings." The Bylaws state, "The primary Object of the Taxpayers Association is "the maintenance of a forum within which to study the issues of government and the problems of those who are governed…through ongoing weekly discourse that will be open to members of the Association, the public, and those who govern…to reveal and understand the true costs of government and to encourage awareness of individual responsibility…and be involved in the process of governance to help insure that the blessings of freedom shall be forever perpetuated."

The Bylaws also state:
• Section I.A(1) -The organization shall be governed by the Articles of the Incorporation, Bylaws, Policies and Procedures, Standing Rules, Special Rules, and Resolutions. It shall adhere to and comply with all applicable Federal, State and local laws, codes, regulations and ordinances (*LORS).
• Section I.A (4) – The organization shall strive to operate in a manner consistent with non-profit best practices and shall maintain ALL records required to be made available for PUBLIC INSPECTION.

The Association has the following Policies and Procedures by which you are required to lawfully abide: Member Ethics, Conflict of Interest, Whistleblowers, Non-discrimination, Retaliation, and Retention of Records. Todd White, Kris Payne, and Andy Nevis have violated ALL those TPA policies and applicable law. Furthermore, the treasurer has a fiduciary to record my annual dues payments. My 2023 and 2024 TPA dues are PAID. That means I AM A MEMBER. Despite my attempts to publicly address the problems, the directors have FRAUDULENTLY held my payments and swept the matter under the carpet.

Regarding your remark, "in its 501c classification, nobody has a right to participate in its proceedings. It is a privilege, plain and simple, and it can be granted and revoked at the discretion of the Board of Directors at any time." That statement is patently FALSE. It is clear the directors do NOT have authority to remove a member particularly if trumped-up, libelous accusations are based upon DECEIT, FRAUD, and DISHONESTY, nor do the directors have authority to hold secret meetings and illicit tribunals for the purpose of my defamation in retaliation for whistleblowing. For example, the multiple falsehoods in the libelous letters penned by TPA President/Planning Commissioner Andy Nevis who is also a CA Water Resources Control Board employee. Andy is a public servant; that means he works for me. Note the applicable law:

Any deceptive, obstructive enterprise undertaken by any public servant that tends to weaken public confidence and undermines the sense of security for individual rights, is against the Supreme Law of the land and all other laws which comply with the state and national Constitutions. Fraud, in its elementary common-law sense of deceit, is the simplest and clearest definition of that word [483 U.S. 372] in the statute. See United States v. Dial, 757 F.2d 163, 168 (7th Cir. 1985)

The following public policies are also applicable to Kris and Andy (expanded version may be viewed in the 1/17/23 BOS Special hearing for the Todd White dismissal:

301. CODE OF ETHICS:
(e) Outside activities should be compatible with the objective performance of your duties or delivery of government service.
(k) Demonstrate the highest standards of personal integrity, truthfulness, and honesty in all public activities.
(l) Uphold these principles being ever conscious that public office is a public trust.
1503.1 Discipline The appointing authority may suspend without pay, reduce in pay, demote, or dismiss any employee who has attained post-probationary status for reasonable cause, including but not limited to:
(d) On-duty or off-duty conduct, including, without limitation, crimes that do not fall within paragraph (c) above, that
(i) tends to bring the County service into disrepute, or
(ii) is a direct hindrance to the effective performance of County functions;

(k) Violation of any of the provisions of applicable law, regulation, these Rules, or County policies;
(p) Dishonesty or theft;
(q) Violation of the County's Code of Ethics;

Because they have stepped outside the lawful scope of their LIMITED duties and authority, and they violated due process of law, they become personally responsible and liable for their actions. Note excerpt:

"The public is entitled to honest services. Whether by your own volition, or under the direction and influence of ANDY NEVIS, President of the Taxpayers Association, you conspired with others to deprive me of honest services and the exercise of my right to access records. In particular was your refusal to provide me with the minutes identifying the participants in the illicit tribunal **held at the request of Andy Nevis** on January 9, 2021 at Ponderosa High School pertaining to the November 5, 2020 incident during the Taxpayers Association meeting involving Sheriff D'Agostini and his former staff member, Stacy Walls. At that time the Sheriff, **KRIS PAYNE,** and Ms. Walls and her daughter had created a scene when I lawfully, and silently, served the Sheriff with three notifications in the form of Affidavits of Truth relevant to EDSO misconduct. I have a right to know who my accusers are, and it is my understanding that you participated in the illicit January 9th tribunal for the specific purpose of my character assassination. As Secretary of the Association, you are required to maintain minutes of all meetings, including names of participants, and make them available for public inspection.
"

Pertaining to your "ad nauseum" remark, please note that fifty years ago, Supreme Court Justice William Douglas asked: "Since when have we Americans been expected to bow submissively to authority and speak with awe and reverence to those who represent us? The constitutional theory is that we the people are the sovereigns, the state and federal officials only our agents. We who have the final word can speak SOFTLY or ANGRILY. We can seek to CHALLENGE and ANNOY, as WE NEED NOT STAY DOCILE AND QUIET. At the constitutional level, speech need not be a sedative; it can be DISRUPTIVE. A function of free speech under our system of government is to INVITE DISPUTE. It may indeed best serve its high purpose when it induces a condition of UNREST, CREATES DISSATISFACTION with conditions as they are, or even stirs people to ANGER."

The TPA continues to operate more like the KKK (a secret society), using threats and intimidation to censor, stifle dissent, and gaslight citizens who have the temerity to exercise their moral and civic duty to whistle-blow about government corruption. Because of the breadth of federal anticorruption law, the Institute for Local Government Public Service Ethics strictly warns to avoid any temptation to walk closely to the line that divides legal from illegal conduct under state law, as well as retaliating against those who whistle-blow.

Your opinion that I am "now treating Kris and Andy more unfairly than they have treated you at any point in time" is ludicrous. They have no authority over me and made it evident they will not speak with me nor allow me to be heard. Per the Bylaws, the documents publicly handed to secretary Andy Nevis are to be "made available for PUBLIC INSPECTION."

You may not be aware of Kris Payne's uncontrolled crazy rants during public meetings. Prior to retiring from working for Capitol legislators I also served as an HR professional in both the public and private sectors. Although the county cannot respond publicly to HR issues, I am perfectly within my 1A rights to bring this to the attention of the public and TPA membership. Kris has openly discussed the reasons he was forced to resign EDC employment was due to inability to handle stress and requiring medications for his condition. His inappropriate conduct and retaliation against me for whistleblowing have been the topic of conversations with County Counsel and meetings with county staff resulting in my formal complaints. By law, such complaints MUST be investigated, acted upon, and retained in the individual's personnel file for a minimum of four years. As such, Kris Payne, Todd White, and Andy Nevis represent a legal liability to EDC requiring they be removed from public office.

Debating Local El Dorado County Politics (Uncensored)

🌐 Public group · 254 members

El Dorado County, CA - Government
Joined about a month ago

Andy Nevis
Added by Kevin McCarty on February 10, 2024
District 4 Planning Commissioner at El Dorado County, CA - Government

Carol Louis
Added by Lee Tannenbaum on February 13, 2024

Kevin McCarty for Supervisor, El Dorado County District 2
Joined about 5 months ago

Kris Payne
Joined about 5 months ago
USC School of Public Administration

Lee Tannenbaum
Added by Erin McCarty on February 10, 2024
Armstrong Atlantic State University

Kevin McCarty

"Everyone is in favor of free speech. Hardly a day passes without its being extolled, but some people's idea of it is that they are free to say what they like, but if anyone says anything back, that is an outrage." — Winston Churchill

Good day to all. This post is to follow up on the shenanigans of the last week with which you are all likely familiar by scrolling down the page.

I'll start by saying that life is generally a frustrating exercise. None of us get exactly what we want all the time. Maturity entails accepting this reality and abiding by Murphy's law, that in order for things to go as intended you personally must ensure that all potential avenues of failure are addressed and resolved.
As a father of two girls, aged 4 and (almost) 6, I am quite familiar with the emotional dynamic of a person wanting something, not getting it, and the tantrums, arguments, and attempts at manipulation that follow. Because they are children, not in full control of their minds and still learning the reality of cause and effect, we can take a deep breath, forgive them, and move on.

It is generally a different phenomenon and harder to "forgive and forget" when grown adults present this mentality. The number of people, professional and otherwise, who desperately try to avoid taking responsibility for their failures in today's America is staggering to behold. Credentials do not guarantee expertise, nor do age and experience guarantee wisdom.

To paraphrase Mr. Churchill, we are all free to speak and act but never free from the consequences of our speech and actions. Some in our EDC community would do well to meditate on this.
If I join a club, and proceed to verbally abuse members of the club and disrupt its meetings, that club has every right in the world to kick me out. I can cry and scream if I like, but it doesn't ultimately matter. Freedom of Association as enshrined under the 1st Amendment cuts both ways.

You and I have rights under equal protection of the law, and in our conduct with government entities. ZERO such rights exist or apply with private organizations, with the exception of non-discrimination based on race, sex, etc. per the Civil Rights Act.

To get to the point, this is an uncensored group. I am not an admin, nor is anyone else except for [Erin McCarty](#) who created this venue under her own volition. I give advice when asked, but do not determine what is allowed to be posted or not. However, recent conduct by a certain community member has strayed far outside the bounds of protected speech.

Since the repeated complaints quite literally serve no purpose to anyone in EDC other than to gratify Ms. Lane's self-righteous indignation, and are now resulting in actions constituting harassment both online and in person, her posts will now and until further notice be subject to admin approval.

If Ms. Lane wishes to calmly and clearly explain and/or debate points of common interest related to EDC local politics, all of her posts will be approved. If she instead wishes to continue with personal attacks aimed at a variety of other community members, they will be denied, and her ability to comment will be suspended.

We appreciate the thoughts and contributions of everyone in this group and believe 100% in the 1A rights to free speech and free association. To ensure that this forum is not hijacked to serve the personal gratification of one individual, I trust that most if not all of you will understand why the limits described above are necessary.

Speak freely, act forthrightly, and be prepared to defend your conduct with reason and logic if challenged. That is what I believe is the responsibility and measure of each American citizen.

Be well, and have a great day! 🇪🇸

Melody Lane
Top contributor · June 24 · 🌐

Kevin McCarty "A big lie is a gross distortion or misrepresentation of the truth primarily used as a political propaganda technique. The German expression was first used by Adolf Hitler in his book Mein Kampf to describe how people could be induced to believe so colossal a lie because they would not believe that someone "could have the impudence to distort the truth so infamously".

The libelous "big lies" (aka gaslighting) and personal attacks by TPA directors, such as you, speaks volumes about your level of character and integrity. In case you weren't aware, prior to retiring I worked for Capitol legislators, and I remain active in Capitol ministries. I've hosted conferences for international speakers, politicians, missionaries, and evangelists from all over the globe. Shame on you for using this site to make libelous, personal attacks against me without examining the FACTS. Since you recently ran for public office, and likely will again, this should concern every EDC TAX PAYING VOTER.

FACT: Several members of the TPA are public officials whose salary is paid via my taxes; they work for me. Contrary to popular opinion, the fact is I have been a paid member of the TPA since 2008. The treasurer PUBLICLY accepted my dues; therefore, I AM A MEMBER. No problem proving my valid membership.

FACT: There is nothing in the Bylaws authorizing closed meetings. The secretary is required to take minutes of ALL meetings to ensure transparency and compliance with the law. Any deceptive, obstructive enterprise undertaken by any individual, organization, or public servant (Todd White, Kris Payne, Andy Nevis, etc.) that tends to weaken public confidence and undermines the sense of security for individual rights, is against the Supreme Law of the land and all other laws which comply with the state and national Constitutions. FRAUD, in its elementary common-law sense of DECEIT, is the simplest and clearest definition of that word.

FACT: In 2009 a TPA director joined me in founding Compass2Truth, a whistleblower organization. Our affiliates are nationwide. Since then, I have been subjected to retaliation and numerous threats by public officials and TPA directors for exercising my moral and civic duty to expose the works of darkness to the light of TRUTH (Eph. 5:11).

FACT: During the 6/25 BOS Open Forum I made factual remarks concerning Carol Louis and Lee Tannenbaum who got

caught in their web of lies and necessitating that the Mgr. of Dennys call PPD. Next at the podium was a TPA director addressing the BOS regarding the ongoing "meanness, LIES, and the TPA mess" (his words). Photos and Carol's libelous post were entered into the public record.

FACT: The following excerpt from Lori Parlin's affidavit concerns former Sr. Services attorney Al Hamilton's threat at a Taxpayers Assn. meeting was witnessed by Carol Louis and Kris Payne: "...at the conclusion of the weekly Taxpayers meeting held at Denny's in Placerville, California, I was talking to Melody Lane while seated across the table from her. Out of the corner of my eye I noticed that Al Hamilton, the President of the Taxpayers Association, was approaching us from behind Ms. Lane. My first thought was that Mr. Hamilton was coming over to talk to me about the Association's refusal to give me an application for membership....There was arguing between them about the audio recordings. At some point during the arguing Mr. Hamilton said that he would call the Sheriff and have Ms. Lane removed from the building for causing a disturbance. Finally, Mr. Hamilton threatened Ms. Lane by saying that he would see to it that her reputation was destroyed in the county. I was shocked to hear him make such a threat, especially the use of "I" and "destroy" in his language. Ms. Lane then asked if Mr. Hamilton was threatening her. He said, no, that was not a threat. I then asked what exactly he meant by those words because it also sounded like a threat to me. I don't remember exactly how the conversation ended because I was shaken up by Mr. Hamilton's threatening words and tone." A complaint was filed and remains on record with the CA BAR. The same unlawful tactics are currently being used by the TPA.

FACT: The Bylaws state the following pertaining especially to the Secretary of the Association (Andy Nevis):
• Section I.A(1) -The organization shall be governed by the Articles of the Incorporation, Bylaws, Policies and Procedures, Standing Rules, Special Rules, and Resolutions. It shall adhere to and comply with ALL applicable Federal, State and local laws, codes, regulations and ordinances.
• Section I.A (4) – The organization shall strive to operate in a manner consistent with non-profit best practices and shall maintain ALL records required to be made available for PUBLIC INSPECTION.

FACT: Todd, Kris, Carol, Andy, and others violated due process of law and are personally responsible and liable for their actions because they stepped outside the lawful scope of their limited duties and authority. See: Morrison v. Coddington, 662 P.2d. 155, 135 Ariz. 480 (1983) - Fraud and deceit may arise from silence where there is a duty to speak the truth, AS WELL AS FROM SPEAKING AN UNTRUTH. See also USC 18 § 241 and USC 18 § 242.

FACT: Relevant excerpt instrumental in Todd White dismissal: "The public is entitled to honest services. Whether by your own volition, or under the direction and influence of Andy Nevis, President of the Taxpayers Association, you conspired with others to deprive me of honest services and the exercise of my right to access records. In particular was your refusal to provide me with the minutes identifying the participants in the illicit tribunal held at the request of Andy Nevis on January 9, 2021 at Ponderosa High School pertaining to the November 5, 2020 incident during the Taxpayers Association meeting involving Sheriff D'Agostini and his former staff member, Stacy Walls. At that time the Sheriff, Kris Payne, and Ms. Walls and her daughter had created a scene when I lawfully, and silently, served the Sheriff with three notifications in the form of Affidavits of Truth relevant to EDSO misconduct. I have a right to know who my accusers are, and it is my understanding that you participated in the illicit January 9th tribunal for the specific purpose of my character assassination. As Secretary of the Association, you are required to maintain minutes of all meetings, including names of participants, and make them available for public inspection."

FACT: Andy's letter of reprimand is based on fraud and is without legal standing. My responsive notifications of legal responsibility in the form of notarized affidavits are based on facts, valid evidence, and law. They stand as truth before any court in America.

FACT: Kris has on numerous occasions created disturbances by his uncontrolled, crazy rants when it was necessary to hold his feet to the fire for violating his oaths of office. That's just one of the reasons he was fired as a PC.

FACT: Kris and Todd colluded to persuade Treasurer Pappas to withhold his December resignation letter until after the counting of ballots. That is ELECTION FRAUD, plus there was no quorum to officially elect the 2024 TPA directors.

Now explain why you advised your wife to CENSOR my appropriate and FACTUAL replies to you and Lee Tannenbaum. Also explain why the disrespectful, personal attacks by the FAKE Marjorie Kays were not removed for violating site rules as I previously requested.

Notice: There are 12 approved (not just 2). Harde's project is "Processing".

	PROJECT_NUMBER	PROJECT_NAME	SITE_APN	SITE_ADDR	STATUS
1	CCUP-A23-0001	Green Gables Growers, Latrobe School District Appeal	067021057	6914 SOUTH SHINGLE RD	APPROVED
2	CCUP19-0001	Foothill Health and Wellness Cannabis Retail Storefront	109420018	3830 DIVIDEND DR UNIT	APPROVED
3	CCUP19-0002	Pure Life Commercial Cannabis Retail Storefront	054391018	535 PLEASANT VALLEY RD 1	APPROVED
4	CCUP19-0003	Kana Commercial Cannabis Retail Storefront	109040071	4020 DUROCK RD	APPROVED
5	CCUP19-0004	3830 DIVIDEND DR _ Distribution	109420018	3830 DIVIDEND DR UNIT	APPROVED
6	CCUP19-0005	3031 ALHAMBRA DR Commercial Cannabis Retail Storefront	083420002	3031 ALHAMBRA DR	APPROVED
7	CCUP19-0006	All Natural Inc.	090440023	4151 SOUTH SHINGLE RD	APPROVED
8	CCUP19-0008	2140 US HIGHWAY 50 retail/ delivery	033050023	2140 US HWY 50	APPROVED
9	CCUP20-0001	Cybele Holdings Commercial Cannabis Cultivation	046071011	3029 FRESHWATER LN	APPROVED
10	CCUP20-0005	Arabian Commercial Cannabis Cultivation	041910008	5445 HAWKEYE RD	APPROVED
11	CCUP21-0001	EMBARC Commercial Cannabis Retail Storefront and Delivery	034671005	3008 US HWY 50	APPROVED
12	CCUP21-0005	Norcanna Commercial Cannabis Distribution and Delivery	117071007	5070 ROBERT J MATHEWS PKY	APPROVED
13	CCUP20-0004	Green Gables Growers Commercial Cannabis Cultivation	067021057	6914 SOUTH SHINGLE RD	DENIED
14	CCUP20-0002	Green Valley Farm Commercial Cannabis Cultivation	104520008		ON HOLD
15	CCUP19-0007	3901 PARK DR BLDG A Retail/ Delivery	121170009	3901 PARK DR A	PROCESSING
16	CCUP20-0003	Kilzer/Somerset Ridge Commercial Cannabis Cultivation	041900000	5840 STEPHANIE CT	PROCESSING
17	CCUP21-0002	Harde Commercial Cannabis Cultivation	093082071	6540 PERRY CREEK RD	PROCESSING
18	CCUP21-0004	Single Source Solutions Commercial Cannabis Cultivation	046710017	4941 D AGOSTINI DR	PROCESSING
19	CCUP21-0006	Gomez/Wilkerson Commercial Cannabis Cultivation	046460031	1820 COUNTRY LN	PROCESSING
20	CCUP21-0007	Rosewood Commercial Cannabis Cultivation	095130051	8331 ROSEWOOD LN	PROCESSING
21	CCUP21-0008	Archon Commercial Cannabis Cultivation	095030036		PROCESSING
22	CCUP22-0001	BH&2K Commercial Cannabis Cultivation	094090010	8260 FAIRPLAY RD	PROCESSING
23	CCUP22-0002	Hidden Ranch Commercial Cannabis Cultivation	046061037	2145 HIDDEN RANCH RD	PROCESSING
24	CCUP22-0003	Landrace Commercial Cannabis Cultivation	068021043	5700 HACKOMILLER RD	PROCESSING
25	CCUP-A23-0002	Sun Ridge Meadows Green Gables Appeal	067021057	6914 SOUTH SHINGLE RD	SUBMITTED
26	CCUP21-0003	Ladybug Row Commercial Cannabis Cultivation	061780011	2130 BOTTLE HILL RD	WITHDRAWN

Berkeley Cannabis Research Center

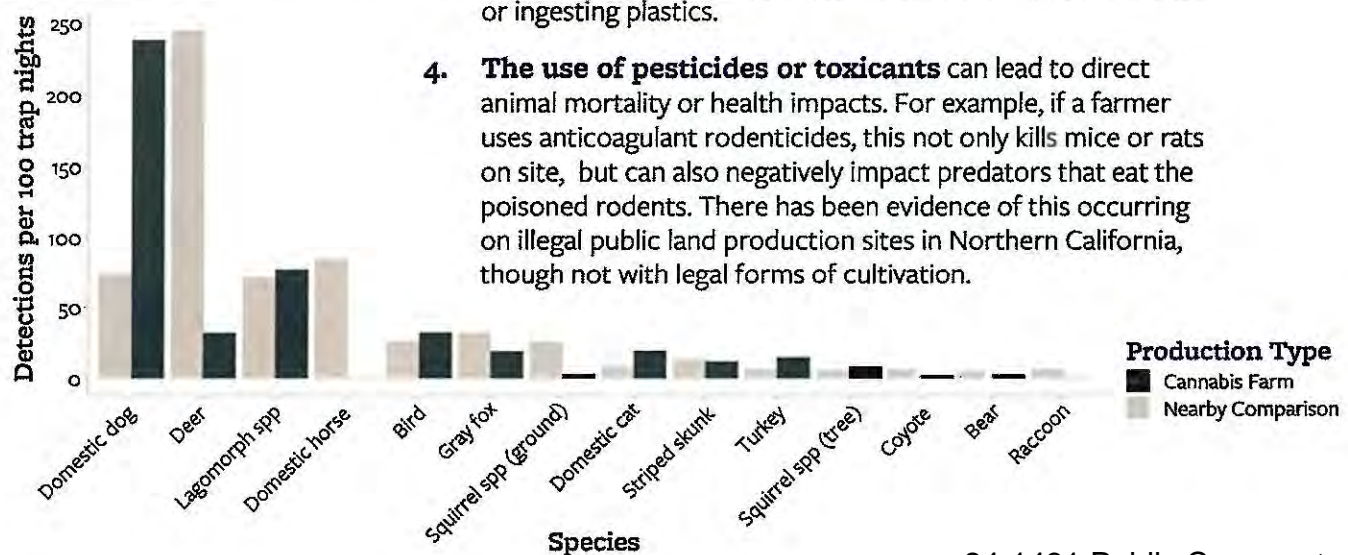# Cannabis Agriculture and Wildlife

January 2021

Concerns for cannabis' potential effect on wildlife have been a recurrent part of the conversation around enforcement and management of cultivation for decades. But what scientific evidence do we actually have for these impacts? The Cannabis Research Center has been studying the interface between wildlife and cannabis since 2017, and while there is still a lot we don't know, there are some emerging themes.

Why might we be concerned about the impact of cannabis on wildlife?

Like any other form of agriculture or human modification of the natural environment, outdoor or mixed light cannabis farming has the potential to alter the ways in which local mammals, birds, reptiles, and insects interact with their surroundings. **There are several potential ways in which cannabis farming might impact wildlife, depending on the form of cultivation and specific practices on site,** including:

1. **Disturbance from light and noise** (for example, from generators or grow lights) can alter wildlife behavior such that they avoid certain areas or become more nocturnal. Alternatively, some animals (such as moths, starlings, or rats) may actually be attracted to these disturbance sources. These disturbances can have ripple effects on entire food webs and wildlife interactions. We have seen evidence for some shifts in wildlife species found on private land cannabis farms compared to nearby sites.

2. **Modification of natural vegetation** (for example, clearing land for a production site, or fencing off an entire parcel) could reduce the extent and quality of wildlife habitat as well as restrict movement and access to critical resources on the landscape.

3. **Unmonitored use or disposal of plastic** monofilament could result in animals getting entangled and injured in lines, or ingesting plastics.

4. **The use of pesticides or toxicants** can lead to direct animal mortality or health impacts. For example, if a farmer uses anticoagulant rodenticides, this not only kills mice or rats on site, but can also negatively impact predators that eat the poisoned rodents. There has been evidence of this occurring on illegal public land production sites in Northern California, though not with legal forms of cultivation.

Wildlife Species detected from motion activated cameras (see example, opposite page) on and nearby small-scale outdoor cannabis farms.

Bar chart. Y-axis: Detections per 100 trap nights (0 to 250). X-axis (Species): Domestic dog, Deer, Lagomorph spp, Domestic horse, Bird, Gray fox, Squirrel spp (ground), Domestic cat, Striped skunk, Turkey, Squirrel spp (tree), Coyote, Bear, Raccoon.

Production Type: Cannabis Farm (dark), Nearby Comparison (light).

Cannabis Agriculture and Wildlife

These potential impacts vary depending on the location, size, type of production, and specific site-level practices of the cannabis cultivation operation. For example, if a farm is located in an area of high biodiversity, there may be more opportunity for wildlife impacts. At the same time, the types of expected effects vary between greenhouse, outdoor, and public land production. Even within specific types of cultivation, there is variation by individual farm practices and operation size.

Are there practices farmers can take to reduce their impact on local wildlife?

Yes, and many are doing so already. While more research is needed to understand what solutions farmers have already identified and put into practice, the following **steps are likely to reduce negative impacts on cannabis farms, or even provide opportunities for positive coexistence with wildlife:**

- cover greenhouses so that any lights used inside are not visible outside
- reduce or eliminate pesticide use
- keep trash out of reach of animals and remove it from the site regularly
- minimize fencing that restricts animal movement
- leave patches of vegetation or trees intact when clearing cultivation areas.

What are some of the outstanding gaps in our understanding of how cannabis agriculture impacts wildlife?

Most existing research on the impacts of cannabis on wildlife comes from opportunistic studies on public land production sites after they have been raided by law enforcement. These sites are likely not representative of cannabis cultivation as a whole. Other studies carried out by the Cannabis Research Center have focused on observational wildlife monitoring on and surrounding small scale outdoor farms on private land. However, in both these cases, sample sizes are small and non-random. Therefore, much of what we know or infer about wildlife impacts is extremely limited.

The science on how cannabis farming interfaces with wildlife would benefit from understanding more about site-level practices and comparisons between them. This means learning from farmers themselves. Even with studies on known impacts, we are currently lacking data on the scale of these effects. Long-term and broader-scale studies will help answer these questions. And finally, we need more data to help understand the potential tradeoffs between different styles and forms of production.

For more information, visit: crc.berkeley.edu or contact vanbutsic@berkeley.edu

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ITEM #2

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Examples of wildlife on cannabis cultivation sites in the Klamath-Siskiyou Ecoregion of southern Oregon [in order from top to bottom: black-tailed jackrabbit (*Lepus californicus*), mountain lion (*Puma concolor*), and California quail (*Callipepla californica*)]. Photo credit: Phoebe Parker-Shames, UC-Berkeley.

Coexisting with cannabis: wildlife response to marijuana cultivation in the Klamath-Siskiyou Ecoregion

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The recent expansion of cannabis agriculture in rural areas of the western United States provides an ideal opportunity to study the outcomes of policy change for land use and wildlife. Small scale (<1 acre), private-land cannabis cultivation has the ability to coexist with or alter surrounding wildlife communities. To date, there has been little to no formal research on wildlife response to this form of cannabis cultivation. This study examines local wildlife community dynamics on and nearby active private-land cannabis farms. Using camera data collected between 2018–2019, we summarized the frequency of occurrence of 11 wildlife species and 3 domestic animals on and adjacent to (within 500 m) eight cannabis farms within the Klamath-Siskiyou Ecoregion in southern Oregon. We also assessed how cannabis production influenced the occupancy (defined here as space use) of black-tailed deer (*Odocoileus hemionus columbianus*), lagomorphs, and gray fox (*Urocyon cinereoargenteus*) in our study area. We found that cannabis farms were generally occupied by smaller-bodied wildlife species, and had a higher proportion of domestic dog (*Canis familiaris*), cat (*Felis catus*), and human activity compared to nearby comparison sites. The presence of a cannabis farm helped explain detection probabilities of deer and gray fox, but did not affect lagomorphs. Farms also helped predict gray fox occupancy, but were not selected in lagomorph or deer models. These results suggest species-specific responses to cannabis cultivation, and highlight the need for further research on site-level production practices and their influence on surrounding ecological communities.

Key words: agricultural frontier, anthropogenic disturbance, camera traps, cannabis cultivation, occupancy and detection, rural development, terrestrial mammals

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Cannabis agriculture is a quickly-expanding industry in the western United States, and represents a new opportunity to study the ecological outcomes of a policy change that

has induced rapid rural land development (Carah et al. 2015; Butsic et al. 2018). Cannabis has been cultivated in the western United States for decades, but as a federally illegal drug it was confined to surreptitious farms, often in remote areas (Corva 2014; Butsic and Brenner 2016). Illegal production on public lands in the West have long elicited concerns about their potential environmental impact via habitat destruction, toxicant use, and poaching (Gabriel et al. 2012; Levy 2014; Carah et al. 2015). However, over the past few years, recreational legalization of cannabis in several states, including California and Oregon, has led to the expansion of production on private land, potentially supplanting much of the production on public lands (Arcview Market Research 2016; Butsic et al. 2018; Klassen and Anthony 2019). This expansion raises new questions about how the evolving cannabis industry may interface with and potentially alter surrounding wildlife communities and their habitats (Carah et al. 2015; Butsic et al. 2018).

While a robust body of literature on wildlife-agriculture interactions may help predict outcomes associated with the growth of cannabis agriculture, cannabis production has several unusual factors that differ from most other crops: 1) remoteness, 2) small individual farm size, and 3) unique spatial pattern on a landscape. Influenced by its illicit history, cannabis is often grown in remote, biodiverse regions with minimal other non-timber agriculture (Corva 2014; Butsic and Brenner 2016; Butsic et al. 2018). Regardless of individual legal status, private land cannabis farms are typically smaller than those of other commercial crops, and are clustered in space, creating a unique land use pattern of small points of development surrounded by less developed land (Butsic and Brenner 2016; Wang et al. 2017; Butsic et al. 2018). This pattern of development in rural areas, particularly in the West, makes cannabis agriculture a frontier industry—one that often occurs at the wilderness boundary—a somewhat rare characteristic for agriculture in the United States (Butsic et al. 2018).

Cannabis production practices vary widely depending on legality and land ownership, which influence the severity and type of environmental impacts from cultivation (Carah et al. 2015; Wilson et al. 2019). It is unclear how many of the environmental concerns associated with public land cultivation can be generalized to private land, but it is likely that many production practices differ. For example, reports and studies on illegal public land cannabis production list the following impacts from these sites: use of anticoagulant rodenticides and other toxicants that can bioaccumulate across food chains, poaching, habitat alteration, illegal water withdrawals, and potential water contamination (Gabriel et al. 2012; Levy 2014; Thompson et al. 2014; Carah et al. 2015; Gabriel et al. 2018). Yet, surveys of licensed and unlicensed cannabis producers in California suggest that toxicant use, poaching, and water contamination may be less prevalent with private land producers (Wilson et al. 2019). In addition, on many private land farms, both licensed and unlicensed, the use of high-powered grow lights, drying fans, and visual barrier fencing may create potential wildlife disturbance (Rich, Baker, et al this issue.; Rich, Ferguson, et al. this issue). Such practices are less common on public land. Given that regulated cannabis agriculture is an emerging industry that has prioritized sustainable cultivation, research on how private land cannabis farms may impact wildlife is conspicuously scant.

Here, we examine how private land cannabis cultivation may interface with wildlife communities on and surrounding outdoor cannabis farms (both licensed and unlicensed). Individual species may respond to different cues on cannabis farms (e.g., lighting, fences, human activity), and so we expected species would exhibit a range of responses including being deterred by, attracted to, or indifferent to cannabis production. For example, larger animals, such as black-tailed deer (*Odocoileus hemionus columbianus*), may be less likely to

use cannabis farms due to fencing and increased human presence (Brashares 2010; Fischer et al. 2012). Alternatively, cannabis farms could attract species such as behaviorally flexible omnivores or foragers through the creation of novel food sources or new edge habitat (Gabriel and Wengert 2019). These individual responses may offer insights into broader community level responses.

The goal of this study was to understand local wildlife community composition on and nearby small, private cannabis farms. We used data from remotely triggered camera surveys (hereafter cameras) to determine whether cannabis cultivation influenced the local distributions of terrestrial mammals (>0.5 kg). To achieve this goal, our objectives were to use camera detections to: 1) describe species composition on and near cannabis farms, and 2) compare individual species habitat-use responses to cannabis production (using occupancy modeling where "occupancy" is redefined as "use" as in Latif et al. 2016). Ultimately, this research is intended to support efforts to predict and mitigate potential outcomes of cannabis development on terrestrial wildlife communities.

METHODS

Study area

Our study area was situated within the Oregon portion of the Klamath-Siskiyou Ecoregion and consisted of farms spread across three sub-watersheds (Slate Creek, Lower Deer Creek, and Lower East Fork Illinois River; defined by USGS hydrologic unit code 12) in Josephine County, southwestern Oregon (42.168, -123.647; Figure 1). We set cameras at 1,240 m to 1,910 m above sea level. The study area included a mix of vegetation types, including open pasture, serpentine meadows, oak woodland, and mixed conifer forest. Rainfall in this region varies seasonally and by elevation, with an average of 82.7 cm annually (Borine 1983). Mean temperatures ranged between 3.9-20.6°C in 2018–2019 (NOAA https://www.ncdc.noaa.gov/cdo-web/).

The Klamath-Siskiyou Ecoregion is one of the most biodiverse temperate forest regions on Earth, in an area that straddles the Oregon-California border and contains several regions identified as critical climate change refugia (Olson et al. 2006; Olson et al. 2012). Several species of concern are present in the county, including native salmonids, threatened Humboldt martens (*Martes caurina humboldtensis*), Pacific fishers (*Pekania pennanti*), and spotted owls (*Strix occidentalis*), all of which are hypothesized to be directly or indirectly affected by cannabis agriculture (Gabriel et al. 2012; Thompson et al. 2014; Carah et al. 2015; Gabriel et al. 2015; Butsic et al. 2018).

Southern Oregon, and Josephine County in particular, have a long history of illicit and medical cannabis cultivation, as well as an active presence in the growing legal industry in Oregon (Klassen and Anthony 2019; Smith et al. 2019). Southern Oregon has become known as a prime destination for outdoor cannabis production, and Josephine County has the highest number of licensed producers relative to population size in the state (Oregon Liquor Control Commission 2019; Smith et al. 2019). Production in the county accelerated after recreational legalization in 2014 (Parker-Shames, unpublished data), and takes a similar form to cultivation occurring across the border in northern California, with clusters of small farms surrounded by undeveloped or less developed rural land (Butsic and Brenner 2016; Wang et al. 2017; Butsic et al. 2018; Smith et al. 2019).
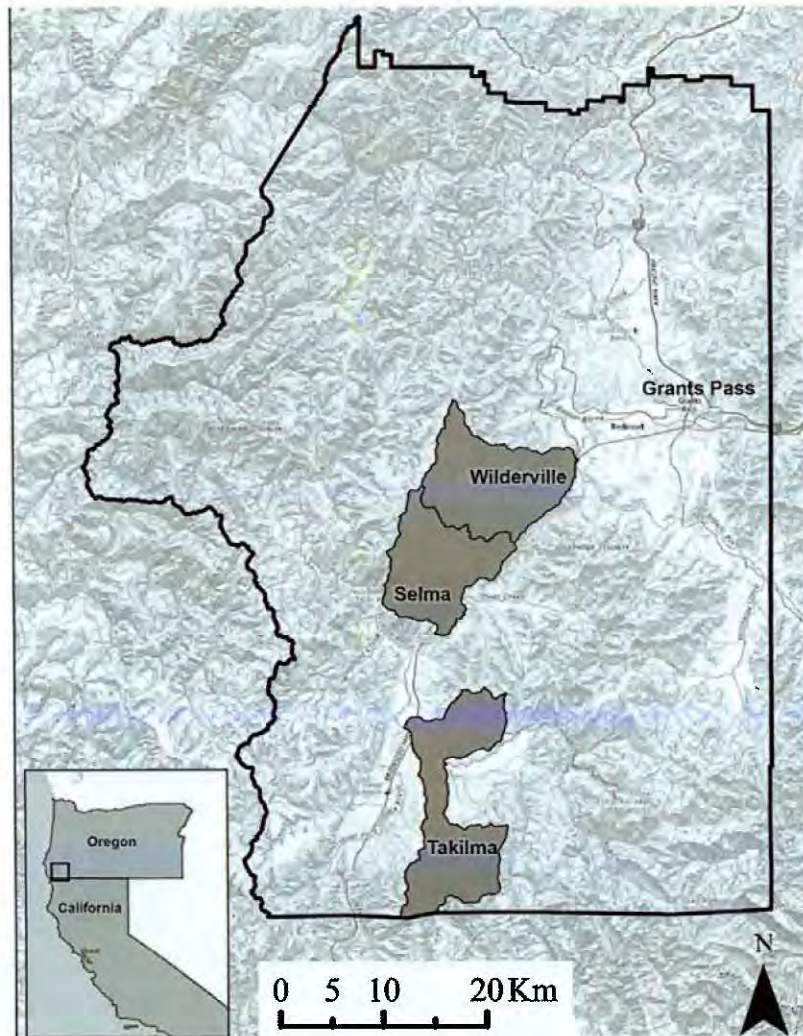
Figure 1. Map of study area with local population centers identified. The study sites are indicated as USGS hydrologic unit code 12 sub watersheds within Josephine County, southern Oregon. All study farms were contained within these three watersheds, and are summarized at this scale to anonymize specific farm locations. From the top down, the sub watersheds are: Slate Creek, Lower Deer Creek, and Lower East Fork Illinois River.

Cannabis farms for this study included one licensed recreational production site, one medically licensed (though non-compliant) production site, and six unlicensed sites. All farms were producing cannabis for sale, though in different markets depending on their access to licensed markets. We selected these eight farms because they (1) were representative of the size and style of cultivation predominant in Josephine County in the years immediately following recreational legalization in 2015 (Parker-Shames, unpublished data), (2) were all established after recreational legalization except for the medical farm, (3) did not replace other plant-based agriculture, and (4) granted us permission to set up cameras on site. Our sampled farms were small (typically < 1 acre), had conducted some form of clearing for production space, and three had constructed some form of fence or barrier around their crop. Nonetheless, specific land use practices and production philosophies differed between farms (e.g., pesticide use, type of fencing, presence of dogs, number of people working on the site, attitudes towards conservation, etc.). We cannot disclose farm locations, as per our research agreement for access.

Camera surveys

Monitored farms were clustered within each watershed: one farm in Slate Creek, five in Lower Deer Creek, and two in Lower East Fork Illinois River. We placed un-baited motion sensitive cameras (Bushnell E3, Bushnell Aggressor, or Moultriecam models) on and surrounding cannabis farm clusters as well as in random locations up to 1.5 km from the farms. To guide the placement of cameras, we overlaid the area surrounding each cannabis farm cluster with a 50 x 50 m grid and then selected a random sample of at least one-quarter of grid cells (a minimum of 45 locations in each watershed), stratified by vegetation openness and distance to cannabis farm. We rotated 15-20 cameras through the sampled grid cells, ensuring each camera was deployed for a minimum of two weeks. As a result of sampling across two years, we likely violated the model's assumption of geographic and demographic closure (Mackenzie et al. 2006), but given our interest was in space use associations and not estimates of occupancy, we believe this is a minimal issue. For this analysis, we restricted our data to a subset of cameras on cannabis farms ("cannabis sites") and cameras in 500 m proximity to farms ("comparison sites") active during the same camera rotation (n = 8 farms, 17 rotations, 2-5 cameras/rotation). Because of rotations and field constraints, all cannabis sites were not monitored at the same time or for the same length of time (one to six rounds). Each cannabis site had at least one, and up to three comparison cameras within 500 m during each of its active rounds. Because of farm clustering, some comparison cameras were within 500 m of more than one farm. Half the cameras on farms (n = 4) were monitored for more than one round, but the comparison camera(s) were not always the same for all rounds due to rotations.

Statistical analyses

We summarized species observations at cannabis farms and created detection histories (i.e., matrices where a "1" indicated the species was photographed at a given camera station during the respective 24-hr time interval, a "0" that it was not, and an NA if the camera was inactive) using the package CamtrapR (CamtrapR v.1.2.3, https://cran.r-project.org/web/packages/camtrapR/index.html, accessed 11 December 2019) in program R (R v.3.6.2, www.r-project.org, accessed 18 December 2019). We used a 24-hr time interval because our focus was on estimating space use associations instead of occupancy, and a short interval reduced the likelihood of the same individual animal being detected on both the farm and comparison camera (Latif et al. 2016; Steenweg et al. 2018). We used the detection matrix to summarize detection rates per 100 operation nights for species found on cannabis sites and comparison sites. We then modeled the occupancy probabilities of the three most commonly detected wild species, which included black-tailed deer, lagomorphs (including brush rabbit *Sylvilagus bachmani* and black-tailed jackrabbit *Lepus californicus*), and common gray foxes (*Urocyon cinereoargenteus*), using the UNMARKED package in Program R (unmarked v.0.13-1, https://cran.r-project.org/web/packages/unmarked/index.html, accessed 11 December 2019). We combined lagomorphs due to uncertainties in distinguishing individual species in photographs.

We used single-species occupancy models to assess factors influencing the likelihood that a species used the area around each camera station (interpreting the "occupancy" parameter as "use" in that it is influenced by both occupancy and availability) and the probability

that the species would be detected given they were present (i.e., "detection probability", as influenced by both availability and perceptibility) (Latif et al. 2016). In this case, detection can also be influenced by fine scale activity and/or habitat use patterns (Latif et al. 2016; Moreira-Arce et al. 2016)

We hypothesized that cannabis cultivation, elevation, water access, and vegetation type would influence species' spatial relationships, and therefore included them as predictors of occupancy (i.e., space use) in the model. We predicted that cannabis cultivation would have a negative influence on a species' probability of using an area. We included a binary, categorical variable in the models to characterize whether detection occurred on a cannabis site (1) or a nearby comparison site (0). This variable reflected and distilled the on-site practices that are common across farms, including increased human activity and fencing. We expected regional elevation to influence species' vegetation use, and therefore used the average elevation within a 1 km buffer of each camera location, from the 30 m National Elevation Dataset (State of Oregon Geospatial Enterprise Office, U.S. Geological Survey, www.gis.oregon.gov). Water access is frequently an important predictor for wildlife occupancy (Rich et al. 2019), especially during dry periods such as during our study years, so we included distance to streams as a predictor of occupancy (NOAA Intrinsic Potential Streams, https://archive.fisheries.noaa.gov/wcr/maps_data/maps_and_gis_data.html). To represent vegetation, we used the percent evergreen forest, as determined via the National Land Cover Database (NLCD 2016, www.mrlc.gov) within a 1 km buffer of each camera site as a vegetation predictor variable. Finally, to distinguish general biogeographic variation between regions, we used watershed as a categorical predictor for occupancy (we assigned cameras as Slate Creek = 1, Lower Deer Creek = 0, and Lower East Fork Illinois River = -1).

For modeling detection, we hypothesized that cannabis production sites would negatively influence the probability that a species was photographed given they were available in the general area, due to both physical barriers to wildlife accessing these sites, and to behavioral shifts, such as animals moving less or moving more cautiously around areas of higher human activity (Smith et al. 2017; Jakes et al. 2018; Tucker et al. 2018). We used distance to road (Josephine County GIS Department 2018) as a proxy for human activity separate from cannabis production that might also negatively influence detection probability. Although cannabis cultivation can be associated with the creation of new roads (Carah et al. 2015), the roads used in these analyses were not those created or used exclusively by cultivators. Finally, we included year as a categorical variable to account for potential inter-annual variation in detection ability.

We standardized covariates to have a mean of zero and a standard deviation of one. We used Akaike's Information Criterion (AIC) (Burnham and Anderson 2002) to compare model fits. We modeled all of the detection covariates first, and then kept our top ranked model for detection constant before modeling our occupancy (use) covariates. We used our top ranked model to assess covariate relationships and determine which variables influenced species use and probabilities of being photographed.

RESULTS

We analyzed over 5,000 animal detections over 957 operation nights (with an average of 31 operation nights per camera). We found that the communities of wildlife present on cannabis farms were qualitatively different from the surrounding, uncultivated areas

(Figure 2). Wildlife on cannabis farms were often smaller-bodied species, and co-occurred with higher human and domestic dog (*Canis familiaris*) activity. There were 18 different species recorded on cannabis farms, and 24 on comparison cameras. Wild predators were predominantly detected on comparison cameras rather than cannabis farms. For example, gray foxes had 18.5 detections per 100 operation nights on cannabis sites compared to a detection rate of 31.6 on comparison sites, while black bears (*Ursus americanus*) had a detection rate of 2.5 on cannabis sites compared to 4.9 on comparison sites, and coyotes (*Canis latrans*) had a rate of 1.9 on cannabis sites and 6.1 on comparison sites. By contrast, domestic predators such as cats (*Felis catus*) and dogs, had a detection rate twice as high on cannabis production sites than comparison sites (Figure 2). It is also worth noting detections of two rarer carnivores: we detected mountain lions (*Puma concolor*) seven times on a cannabis farm and once on a comparison site, and bobcats (*Lynx rufus*) two times on each.
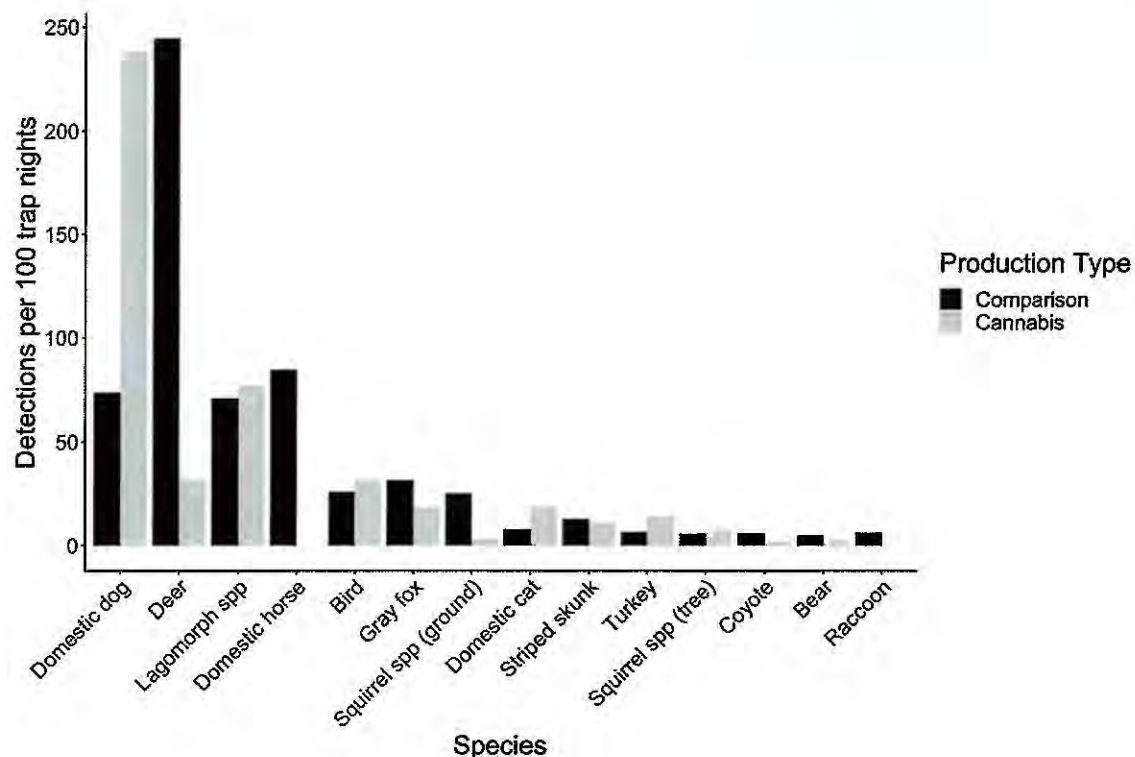
Figure 2. Top animal species present at cannabis (8) versus comparison (24) sites, by detection rate (number of detections per 100 sampling occasions). Excludes any species detected less than a total of 10 times at all sites combined. Excludes humans, which were the most frequently detected presence on both cannabis and comparison sites (detection rate of 1306.6 on cannabis sites and 478.7 on comparison sites).

For the single species occupancy models, detection variables varied by species. The top models for deer and gray foxes included a negative association with cannabis production for detection, while the top model for lagomorphs did not have similar associations (Table 1). Distance to roads was retained in all models for detection, and was positively associated with detection for all species, such that detection increased with increasing distance from roads.

For occupancy, here defined as use, cannabis production had a weak negative association with gray fox occupancy, and was not a top occupancy variable for any of the other species (Table 1). Because watershed and forest cover were correlated ($R^2 = 0.86$), we only used the variable with the highest univariate effect size for each species. For instance, watershed had a higher univariate effect size than forest cover for deer and gray fox occupancy, so we used watershed for candidate selection in those models, and forest cover for lagomorphs. No single variable was consistently selected as a predictor of occupancy across all species.

Table 1. Results from the top space use models for each species, including occupancy (defined in this case as use) and detection (influenced by both availability and perceptibility) variable beta estimates and 95% confidence intervals in parentheses. Stars are on confidence intervals that don't overlap zero.

Species	Occupancy Variables				
	Cannabis Production	Watershed	Elevation	Forest within 1 km	Distance to Streams
Black-tailed deer		-2.82 (-5.37– -0.27)*			
Gray fox	11.17 (-102.4–124.7)		-1.18 (-2.61–0.25)		
Lagomorphs				-0.99 (-2.29–0.30)	-0.73 (-2.32–0.86)
Species	Detection Variables				
	Cannabis Production	Year 2018	Year 2019	Distance to Roads	
Black-tailed deer	-1.71 (-2.26– -1.16)*	-0.485 (-1.02–0.05)	0.519 (-0.01–1.05)	0.522 (0.30–0.74)*	
Gray fox	-1.81 (-2.33– -1.29)*			1.81 (1.21–2.41)*	
Lagomorphs		0.45 (-0.021–0.92)	4.25 (2.85–5.66)*	0.77 (0.45–1.09)*	

DISCUSSION

This study represents a first step to quantify patterns of wildlife avoidance and coexistence on and surrounding active small-scale cannabis farms on private land. Our observational monitoring data suggest that wildlife species may be affected by these locations and may be altering their use of these environments. Specifically, our results suggest that 1) wildlife are consistently present on and around cannabis farms, 2) private land cannabis production may influence the local space use of some species more than others, and 3) cannabis farms may deter larger-bodied wildlife species in particular. Although limited by a small dataset, these results offer valuable insights into the ecological outcomes of the emerging cannabis industry.

The assessment of wildlife detection rates suggest that many wildlife species are consistently present at cannabis production sites (Figure 2, Figure 3). Whereas some species detected on cannabis farms are ones that have been recorded in the western United States as more tolerant to agriculture or disturbance (e.g. striped skunk, raccoon, deer), others are species that tend to avoid human activity (e.g. mountain lion, bobcat) (Crooks 2002; Gehring and Swihart 2003; Hilty and Merenlender 2004; VerCauteren et al. 2006). While we did detect some relatively rare species (mountain lion, bobcat), we did not detect others such as fishers or ringtails (*Bassariscus astutus*), and cannot assess whether this is due
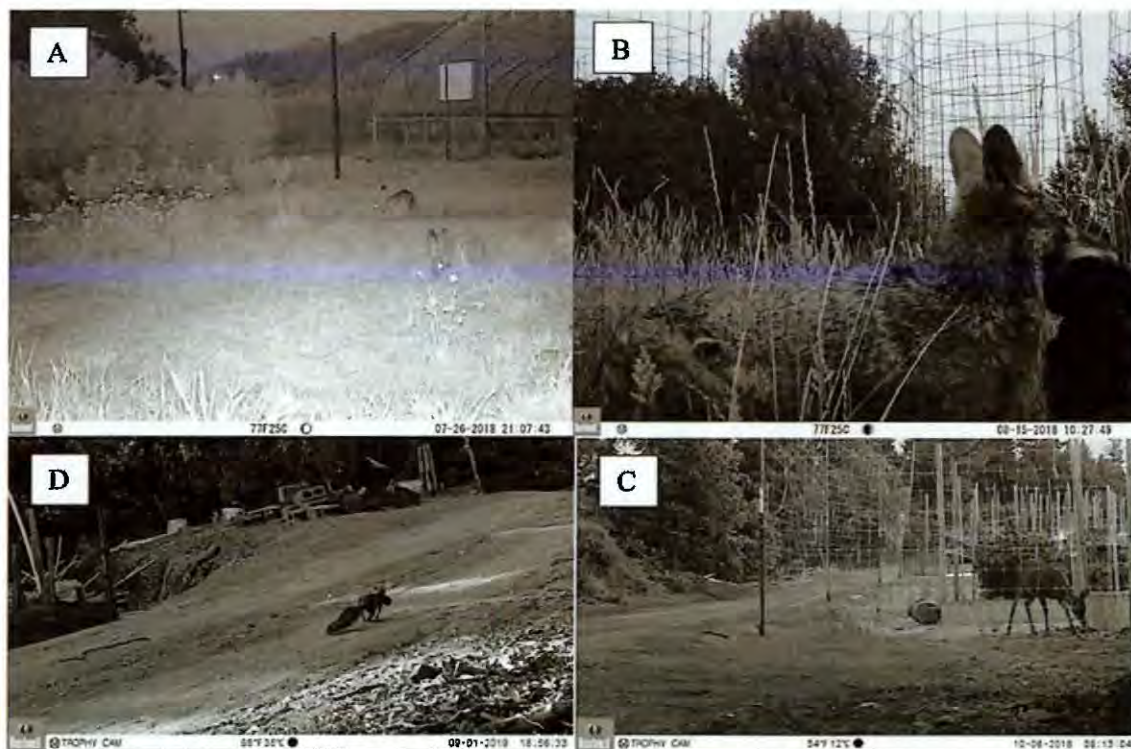
Figure 3. Examples of photos from cameras at cannabis sites demonstrating varied space use by wildlife at cannabis farms. A) Two black tailed jackrabbits (*Lepus californicus*) resting and foraging. B) A coyote (*Canis latrans*) passing through a cannabis farm with a prey item in its mouth. C) A squirrel (*Sciurus* sp.) passing in front of the camera carrying an unknown food item. D) A black-tailed deer (*Odocoileus hemionus columbianus*) appearing to forage at the base of a cannabis planter (the wooden box holding the cannabis plant in the photo).

to true absence or simply short study duration. We infer detection of wildlife on cannabis farms implies a potential for these species to move through these areas. In addition, some photos revealed foraging or resting behavior (Figure 3), which may indicate that cannabis agriculture could maintain biodiversity as other small scale agricultural crops have in other systems (Mendenhall et al. 2016). However, understanding long term impacts of cannabis production would require information on farm-level land use practices. For example, if animals on private land cannabis farms suffer fitness consequences similar to the toxicant exposure occurring on public land production, then coexistence on these sites may be detrimental in the long term (Levy 2014; Thompson et al. 2014; Carah et al. 2015; Gabriel et al. 2015; Gabriel et al. 2018).

Modeled use and detection probability results indicate that despite a general wildlife presence at cannabis farms, some animals may be more affected by these areas than others. For detection, both deer and gray fox were influenced by cannabis farms (Table 1). Distance to roads was positively associated with all species detection, suggesting that animals are consistently avoiding roads, but no other variable was consistent across all species for either detection or use. For occupancy (i.e. space use), cannabis farms were not selected for deer or lagomorph models (Table 1), but we suspect this could have been due to our close proximity of cannabis and comparison locations. It is possible that these species would move >500m within a 24-hour period, making it difficult to distinguish space use. Additionally, because we pooled lagomorph species, it is possible that either brush rabbits or black tailed jackrabbits individually might have responded differently to cannabis production. Nonetheless, cannabis farms influencing detection probabilities for deer and gray foxes may imply an influence on repeated visits over our time period, and potentially a behavioral adjustment near cannabis farms.

There are many possible explanations for why deer and gray fox space use might be more influenced by cannabis farms than lagomorphs. These generally have to do with characteristics on the farms themselves. Wildlife may be interacting with the increased presence of domestic cats and dogs on cannabis farms (Figure 2), for instance, for deer as potential or perceived prey, or gray foxes as competitors (Zapata-Ríos and Branch 2016; Reilly et al. 2017; Twardek et al. 2017). Alternatively, deer and gray foxes may be responding to behavioral cues from increased human presence and activity on cannabis farms (Berger 2007; Tucker et al. 2018). Lagomorphs may be responding to these same cues, but via different response mechanisms. It is possible that lagomorphs are more behaviorally flexible than deer and gray foxes and can avoid altering their spatial patterns by instead shifting their temporal activity patterns, for instance, becoming more nocturnal (Gaynor et al. 2018). More research is needed to disentangle these potential mechanisms.

Both detection rate summaries and model results suggest that cannabis farms appeared to disproportionately influence the space use of larger wildlife species. Black bears had a higher detection rate on comparison sites compared to cannabis farms (Figure 2) and the model results indicate that larger black-tailed deer and gray foxes might avoid cannabis farms, while smaller animals such as lagomorphs appear to be unaffected. This result is expected, as large bodied animals such as deer may be unable to access space on the farms if they are physically blocked by fencing, while smaller species are still able to move through these barriers (Brashares 2010; Jakes et al. 2018).

Despite variation in which species responded to cannabis farms, we did not find evidence from either detection rate summaries or model results to suggest that predators

were attracted to these sites. Other studies have shown predators tend to avoid agricultural development, and our results seem to support the same trend (Gehring and Swihart 2003; Hilty and Merenlender 2004). By contrast, there has been recent suggestion that cannabis production on public lands may serve as an "ecological trap" by attracting carnivores to production areas that then expose individuals to deadly toxicants (Gabriel and Wengert 2019). Our results, at least in the short-term, suggest that this dynamic may be less likely to occur on small-scale private land cannabis farms. This highlights the different potential ecological threats and processes playing out on public versus private land cannabis production sites. Not only do private land cannabis farms seem to use fewer toxicants (Wilson et al. 2019), but they may also have higher human activity levels on site compared to public land production located in more remote areas. Wildlife may in turn tend to avoid this human presence rather than being attracted (Smith et al. 2017).

This study begins the discussion regarding a glaring shortage of data on animal space use on cannabis sites, but there are many further avenues for future research. For example, the relative importance of cannabis farms in their influence on animal space use should be analyzed in the surrounding landscape context. The influence of roads on the modeled detection results implies that cannabis cultivation, despite occurring in a rural area in this case, was not the only form of human disturbance to which animals were responding. It may therefore be useful to compare cannabis and other forms of rural land use. In addition, it is necessary to conduct further study at broader spatial and temporal scales in order to examine long term wildlife community response to cannabis and unravel the complicated set of potential contributing factors.

Management and conservation implications

Wildlife are likely to have species-specific responses to small-scale outdoor cannabis farms, and, thus, the specific land use practices occurring at a site may be influential for biodiversity conservation in these communities. Future studies should examine the role of fencing, timing of human activity, presence of domestic dogs and cats, and other site level practices that may influence wildlife use. Many small-scale cannabis farms are not part of a licensed production system (such as most included in this study), and therefore cannot be regulated for their production practices (Polson 2015; Short Gianotti et al. 2017). For these producers, a mix of educational resources on wildlife friendly growing practices, grower-enforced community standards or expectations, and law enforcement efforts to reduce noncompliance, may play an important role in increasing or maintaining biodiversity. For species deterred from cannabis farms, such as was implied by our deer and gray fox results, further research is needed to understand the mechanism for this avoidance. If, for example, fencing, artificial lighting, or sound are identified as major causes of this deterrence, then careful consideration should be given to the regulations on these practices at cannabis farms and their relation to critical habitat features such as water sources or animal migration routes.

Author Contributions
Conceived and designed the study: PPS, advised by JB, and with consultation from LR
Collected the data: PPS
Performed the analysis of the data: PPS and WX, with guidance from LR
Authored the manuscript: PPS
Provided critical revision of the manuscript: PPS, WX, LR, and JB

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