Appendix A

NOP and Comments

NOTICE OF PREPARATION DOCUMENTATION AND PUBLIC SCOPING MEETING FOR A DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE LICENSING OF COMMERCIAL CANNABIS CULTIVATION IN MENDOCINO COUNTY PROJECT

Date: August 2, 2023

The Department of Cannabis Control (DCC) intends to prepare an Environmental Impact Report (EIR) for the Licensing of Commercial Cannabis Cultivation in Mendocino County Project (the "Project," described later in this document). The EIR will be prepared pursuant to the California Environmental Quality Act (CEQA), Public Resources Code, sections 21000, et seq., and the CEQA Guidelines, California Code of Regulations, title 14, sections 15000, et seq.

DCC and Mendocino County have worked in partnership to support provisional cultivation licensees' transition to annual licensure within the County. DCC, which is responsible for the issuance of state commercial cannabis cultivation licenses, will be lead agency in accordance with CEQA in connection with the issuance of such licenses in Mendocino County.

This Notice of Preparation (NOP) has been prepared pursuant to CEQA Guidelines, section 15082, to notify the Office of Planning and Research, responsible and trustee agencies, and other interested parties that an EIR will be prepared. The NOP provides sufficient information describing the Project and its potential environmental effects to allow recipients the opportunity to provide a meaningful response related to the scope and content of the EIR.

The DCC made the determination to prepare an EIR following preliminary review of the Project. Pursuant to CEQA Guidelines, section 15063(a), because an EIR is needed, an initial study has not been prepared. Probable environmental effects of the Project are described in the attached Project summary.

As specified by the CEQA Guidelines, the NOP will be circulated for a 30-day review period. The comment period starts on **August 2, 2023,** and ends on **August 31, 2023**. The DCC welcomes agency and public input during the review period. In the event the DCC has not received either a response or a well-justified request for additional time by a responsible agency by the end of the review period, the DCC may presume that the responsible agency has no response. (CEQA Guidelines, § 15082(b)(2).)

The DCC requests that comments be submitted in writing, during the review period and addressed to: Department of Cannabis Control c/o Angela McIntire-Abbott, 2920 Kilgore Road, Rancho Cordova, CA 95670 or emailed to: publiccomment@cannabis.ca.gov.

The DCC will hold a virtual scoping meeting at the following date and time listed below:

Tuesday, August 22, 2023 – 10:00 AM to 12:00 PM

Attendees may participate via WebEx online meeting platform or telephone conferencing. To participate via WebEx online meeting platform please email Charisse Diaz at Charisse.Diaz@cannabis.ca.gov or (916) 465-9025 by 4:30 p.m. on August 21, 2023, to request a link to the meeting. The link to the meeting will also be posted on DCC's website no later than 9:00 a.m. the day of the scoping meeting.

As a reasonable accommodation, limited in-person seating may be available at the scoping meeting in the Department Hearing Room, 2920 Kilgore Road, Rancho Cordova, CA 95670. Attendees must comply with all COVID-19 safety protocols. Please contact Charisse Diaz at Charisse.Diaz@cannabis.ca.gov or (916) 465-9025 by 4:30 p.m. on August 21, 2023, if an accommodation is necessary.

Participants will be given instructions on how to provide oral comment once they have accessed the scoping meeting. The scoping meeting will proceed on the date noted above until all comments are submitted or 12:00 PM, whichever is later. At the scoping meeting, any person may present oral or written statements. DCC requests, but does not require, that persons who make oral comments at the scoping meeting submit a written copy of their comments via email.

PROJECT LOCATION AND SETTING

Mendocino County is located along the Pacific Ocean in the northwestern portion of California. The county is bordered by Humboldt and Trinity counties to the north, Tehama, Glenn and Lake counties to the east, and Sonoma County to the south. The county is approximately 2,247,000 acres (including the incorporated cities) (see Figure 1).

Mendocino County is predominantly rural, with a majority of its land area consisting of forest and agricultural areas. Approximately 16 percent of the county's land area is under federal, state, and tribal ownership. Development (residential, commercial, office, and industrial) is located within the county's nine unincorporated communities (Anderson Valley/Boonville Area, Round Valley/Covelo Area, Fort Bragg Area, Hopland/Sanel Valley Area, Laytonville Area, Potter Valley Area, Redwood Valley Area, Little Lake Valley Area, and Ukiah Valley Area) and the incorporated cities of Fort Bragg, Point Arena, Ukiah, and Willits.

PROJECT DESCRIPTION

The DCC has issued approximately 608 provisional commercial cannabis cultivation licenses in Mendocino County. The Project consists of the DCC actions to approve annual licensing of such commercial cannabis cultivation operations in Mendocino County under California Code of Regulations, title 4, section 15002.

The EIR will programmatically evaluate the environmental impacts of the DCC's annual licensing of commercial cannabis cultivation operations in the county as well as the environmental impacts of future licensed commercial cannabis cultivation operations.

PROBABLE ENVIRONMENTAL EFFECTS

The DCC has determined that Project may result in significant environmental impacts; therefore, an EIR will be prepared. Potential issues and impacts to the existing environment to be analyzed in the Draft EIR include the following environmental topics:

- Aesthetics
- Agriculture and Forestry Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Energy
- Geology and Soils
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use and Planning
- Mineral Resources
- Noise
- Population and Housing
- Public Services
- Recreation
- Transportation
- Tribal and Cultural Resources
- Utilities and Service Systems
- Wildfire

Source: Data received from Mendocino County in 2023; adapted by Ascent in 2023.

Figure 1. Mendocino County and Incorporated Cities

The EIR, consistent with CEQA, will include sufficient information to facilitate meaningful public review and informed public decision making regarding the significant effects on the environment that may be caused by the project. The EIR will include information regarding the environmental baseline, including the past, current, and reasonably foreseeable expected future environmental impacts of implementing the project in the project area. Where needed, the Draft EIR will identify potentially feasible mitigation measures to avoid and/or substantially lessen any significant adverse effects identified in the EIR's impact analysis.

The EIR will also address the cumulative environmental consequences of the proposed project in combination with other closely related past, present, and reasonably foreseeable future projects in the area. This will serve to satisfy CEQA requirements regarding potential regional cumulative effects.

In compliance with California Code of Regulations, title 14, (hereinafter, CEQA Guidelines), section 15126.6, the EIR will describe and evaluate the effects of a reasonable range of alternatives to the proposed project and will compare the impacts of the alternatives to the impacts of the proposed project. The EIR will also identify any alternatives that were considered but rejected by the lead agency as infeasible and briefly explain their reasoning. The EIR will provide an analysis of the No Project Alternative and will also identify the Environmentally Superior Alternative. The alternatives to be analyzed in the EIR will be developed during the environmental review process and will consider input received during the Notice of Preparation comment period.

Response category	Comment Date	Commenter/Contact	Agency/Organization Name	Comment Nature	EIR Topic Addressed
Individual	8/19/2023	Stephen Cato	N/A	Existing CEQA coverage already completed.	None
Individual	8/19/2023	Ronald K. Ford	N/A	Concerns related to ag/forestry, hydro/water quality, land use/planning, tribal and cultural resources, and water supply	Agriculture and Forestry Resources, Hyrdology and Water Quality, Land Use and Planning, Cultural and Tribal Cultural Resources, Utilities and Service Systems
Agency	8/2/2023	Cameron Vela	Native American Heritage Commission	AB 52 consultation requirements and overview	Cultural and Tribal Cultural Resources
Individual	8/24/2023		N/A	Proposition 64, taxation, scale of outdoor cultivation	None
Individual	8/24/2023	Lori Barra	N/A	Concerns related to fencing, debris from abandoned sites, quality of other ag uses near cannabis operations, introduction of pests from cannabis uses, odor, light pollution, hazardous products used at cultivation sites, impacts to soil and water table, use of pesticides and other products such as gas and propane tanks from cultivation sites, water diversions, water theft, impacts to bio resources as a result of water diversions and pesticides, home values, noise pollution, real estate prices, security (guard dogs, fencing, firearms), availability of housing, public safety and service resources, decreased recreation, increased traffic on rural roads and safety for other road users (bikes, horseback), increased electrical and water usage, wildfire potential increases	Aesthetics, Agriculture and Forestry Resources, Air Quality, Geology and Soils, Hazards and Hazardous Materials, Hydrology and Water Quality, Biological Resources, Noise, Population and Housing, Public Services and Recreation
Individual	8/24/2023	Pete and Tanya Lucchesi	N/A	Visual impacts of neighboring uses, odor, water sources and wetlands, availability of groundwater for uses that rely on wells, crime	Aesthetics, Air Quality, Hydrology and Water Quality, Biological Resources
Organization	8/30/2023	Ellen Drell	Willits Environmental Center	Similar projects throughout the State, PS impacts, questions related to licensing process, evaluation of cumulative impacts, baseline, existing vs. future cultivation operations, responsible entity for confirming individual site compliance, purpose of project/connection with the 2017 IS/MND, DCC involvement in cannabis licensing in other counties throughout the state, project cost, changes to Mendo County's existing cannabis cultivation regs and statutes	Project Description, Cumulative Impacts
Agency	8/31/2023	Rebecca Garwood	CDFW	Baseline, processing of licenses and permits, cumulative impacts, habitat impacts, impacts to surface water/hydrology and groundwater, impacts to wetlands, degradation of water quality and habitat, impacts to bio resources resulting from cannabis operations (entrapment, fish passage barriers, light pollution, non-native species introduction, and degradation of habitats), adequate stream flows and meeting water demand for cultivation sites, overuse of surface water diversions, regulate development of constructed ponds, impacts to floodplains, light pollution and noise impacts on wildlife, impacts to listed species	Aesthetics, Biological Resources, Hydrology and Water Quality, Utilities and Service Systems
Individual	8/31/2023	Laura and Marty Clein	N/A	Existing CEQA coverage already completed.	None
Individual	8/30/2023	Cynthia Grant and Richar	N/A	Hazardous materials (pesticides), crime	Hazards and Hazardous Materials
Individual	8/31/2023	Jim and Francis Owen	N/A	Water use, groundwater supply, traffic noise and quality of roadways from increases traffic, visual impacts of operations, hoop house gas emissions, odor	Hydrology and Water Quality, Noise, Transportation, Air Quality, Greenhouse Gases and Climate Change, Aesthetics,
Agency	8/31/2023	David Longstreth	California Department of Conservation	Slope stability (including landslides), unpermitted grading projects (from cannabis operations) that have adversely affected slope stability, aquatic habitat impacts, sedimentation, location on or within vicinity of known fault zones, NOA and other hazardous materials	Geology and Soils, Biological Resources, Air Quality, Hazards and Hazardous Materials
Organization	8/31/2023		Mendocino Cannabis Alliance	2017 IS/MND, baseline, cumulative impacts, comparison against other ag uses, information related to existing requirements/processes, wildfire exposure mitigated through tanks and ponds,	Project Description, Cumulative Impacts, Wildfire
Individual	8/31/2023	Marnie Birger	N/A	Existing CEQA coverage already completed.	None
Individual	8/31/2023	L. Galandil	N/A	Impacts to rural roads, impacts to wetlands, trees, habitats, water use and availability, water diversion and sediment impacts, erosion impacts, mandatory inspections of cultivation sites	Biological Resources, Utilities and Service Systems, Hydrology and Water Quality, Geology and Soils, Transportation
Individual	8/31/2023	Gary and Judith Maddox	N/A	Aesthetics, air quality, water, crime, quality of life and property values	Aesthetics, Air Quality, Hydrology and Water Quality, Utilities and Service Systems
Individual	8/30/2023	Collen Browder	N/A	Impacts to roads, compatible uses, traffic increases, visual impacts, odor, Williamson Act contract lands, dust, water use, truck trips, off-gird energy operations, loss of soil, groundwater supply, noise associated with traffic, available housing for employees, risk of wildfire	Aesthetics, Agricultural Resources, Air Quality, Biological Resources, Energy, Geology and Soils, Greenhouse Gases and Climate Change, Hazards and Hazardous Materials, Hydrology and Water Quality, Land Use and Planning, Noise,

Agency	8/31/2023	Erik K. Huff	CALFIRE	Fire risk related to indoor cultivation, response times of local public services, compliance with fire, electrical, building regs, outdoor cultivation fire risk, generators, water use/availability, conversion of timberland uses	Agriculture and Forestry Resources, Public Services and Recreation, Wildfire, Air Quality, Greenhouse Gases and Climate Change, Energy,
Individual	9/1/2023	Bill Krawetz	N/A	Illegal grows, crime, water demand/availability, stream diversions and impacts to surface water, fire safety and risk, limited information provided in NOP to provide meaningful comments	Utilities and Service Systems, Hyrdology and Water Quality, Biological Resources, Wildfire
	Scoping Meeting Comments (8/22/23)				
Individual	8/22/2023	Karine Powell	N/A	Curious about timeline, "how does the site specific component of the CEQA requirement factor into the EIR or after the EIR". EIR will be certified- How? If DCC is lead agency will they be certifying their own work or will that go to another agency. Grant funds for Mendo county will be used for the work product of Ascent. Wants access to unredacted version of the DCC's contract with Ascent to see where the money is going as opposed to where it might have been available to farmers. Many of the installations in our Farms have been predicated on regulations from those earlier eras and locally in Mendocino County from a host of program leadership at least changed eight times maybe more by now, should be taken into consideration we are good stewards and should not be penalized for then or now and what will change in the future. Asking us to include in any processes for permitting, evaluation, and denials of licenses, that a very specific appeals process be included that is fair and reasonable. Why is 4th page in scoping document blank.	Project Description
Individual	8/22/2023	Paul Hansberry	N/A	What is a significant impact within an EIR and what is a cumulative impact instead of site specific. 10,000 sq ft is max. Water measurements, how cumulative effects are determined. Will impacts get carried on or site specific. Why do we have to go through all this expense, trouble and complications especially for Growers before 2016. Finds it interesting only people who are commenting are the people who it will impact, not getting any public comment from environmental groups who would be mostly concerned or demanding the site specific EIR done- not giving insight of what they want to see. Do not include unlicensed cultivators with people who are stewards of the land when considering the cumulative effects. Penalizing the people that want to do the right thing by lumping them in. Making them suffer for that and Under The Heading of cumulative effects that it feeds the purpose of a site-specific CEQA report.	Project Description; Cumulative Impacts
Individual	8/22/2023	Susan Tibben	Lovingly and Legally	Climate change, integrating dealing with continued severe climate change with particular regards to small operations. As we go forward, we respectfully but importantly and urgently ask that whenever possible um photographs electronic video be used to document various situations on our cultivation, it saves gas in the environment and it saves US money that we don't have anymore and you know in in as much as those document kinds of documents will be time stamped. alternative methods instead of sending someone out to rural areas- too expensive.	Greenhouse Gases and Climate Change
Individual	8/22/2023	Swami	N/A	Mitigated neg declaration and appendix g, spent lots of money, why are we doing this for agricultural crop and other ag crops don't require a CEQA report. Thinks we are preventing folks from becoming annual growers. CEQA Baseline. So little area for cannabis cultivation. Lessened the impact because so few people are in the program. Gov keeps changing regulations. EIR is covering all the same things as appendix G. Been doing this process since 2016. Water use, irrigation, EIR of how level or tilted their land is, CA food and Agriculture, we've already been approved for all those things otherwise we wouldn't have a license right so again this seems duplicative and punitive.	Biological Resources, Utilities and Service Systems, Hydrology and Water Quality, Geology and Soils, Transportation
Individual	8/22/2023	Rebecca Garwood	N/A	This CEQA document is reverse based on previous projects. Disappointed presentation didn't cover that. Untraditional CEQA Document. Unsure how this CEQA is going to get used. What are the steps though DCC. Cumulative impacts should be included since e they can be measured when they typically cant.	Project Description, Cumulative Impacts
Individual	8/22/2023	Michael Katz	Executive Director of the Mendocino Cannabis Alliance	The cannabis operations have had a "lack of impact" in comparison to Wine Growers. MCA (Mendocino Cannabis Alliance) mission statement calls for sustainable economic development.	None.
Individual	8/22/2023	Michelle Shot	N/A	Curious how the EIR will interface with the site specific part of CEQA for each individual farm.	Project Description
Individual	8/22/2023	Greenpal	N/A	How appendix G info accumulated, what info will be utilizable, will any of the environmental info they prepared be used?	Project Description, individual EIR resource topics

Individual	8/22/2023	Hannah Nelson	N/A	Consider Larger context vs anomalous context impacts, The baseline was never accurately studied and covered. this activity and many of the same activities have been going on for a very long time but have not been captured because of the legal posture of cannabis. Other activities exist also like logging, homestead, farming not just cannabis. Impacts from all not just cannabis. Important to build this EIR to serve the community going forward not prevent people from entering the cannabis industry. A lot of fear based on continual requirements and regulations that have changed and trying the again anomalous position of trying to take an existing uh activity and conform it to new state laws and regulations and then try to fit that round peg in the square hole or even maybe a triangle of CEQA law. Opportunity for people to dig deep and really asses all impacts in a quantitively manner. pay attention to prior activities and their baselines, not just regulated but of any unregulated or other industry (Logging). This is not a pass/fail situation but more of an evaluation. What issues and factors can impact/mitigate going forward. Baseline vs cumulative impacts and the importance of gathering both	Project Description, Cumulative Impacts
Individual	8/22/2023	Josh	N/A	Copy of slideshow. How is work done for appendix G getting incorporated in CEQA. Biggest impact for county is not permitted cultivators but the thousands of unpermitted cultivators.	None.
Individual	8/22/2023	Colin User #3	N/A	People who are more conversant with what's happening environmentally or aware of well that's a Law Enforcement issue. Spent thousands on appendix G's. Requests EIR take into account what they have already done, continue doing and want to contribute to Mendo county health of the community. feels very punitive.	Project Description
Individual	8/22/2023	Phil Cruz	N/A	Most small farms have been good stewards of the land, living off grid. He believe they are part of the movement of who is environmentally concerned and wants recognition/exemption for that- small, off grid farms.	None.
Individual	8/22/2023	Monique Ramirez	N/A	Get people through who have had build outs, move plants, protection for people who did that within a certain boundary/distance. Assessments done in a logical way. Tribal impacts. When MND was first drafted, her community/tribe did not receive a letter for the EIR. Wants an annual state license in the long run and the ability to look at the people that are doing third-party certifications that are regeneratively farming not only for cannabis but maybe for or other agricultural purposes and those significant impacts but have been acknowledged. Counter balance negative prop 64 actions.	Tribal Cultural Resources
Individual	8/22/2023	Chantal Simon Petrie	MainSpring Consulting out of Ukiah and Mendocino County	EIR addresses environmental Impact of Mendo County not the individual and cumulative impacts from the illegal cannabis industry. EIR analysis should include comparative metric to other agriculture in Mendo county- grapes, cattle grading, etc.- to have context whether impacts are significant or not and show a comparison. Appendix G provided to Mendocino County phase one cultivators as to whether or not those already prepared appendix G materials will be utilized to support the site's specific analysis and if so how specifically the process that those materials can be provided to ascent is it to be done through the DCC is it to be done through Mendocino County and the request is that those materials that were already paid for and prepared according to previously provided years of direction from the DCC and the county be utilized and not be done not be a waste of people's money um the last thing I comment on is for. Explain overlapping environmental agency requirements: Water use, storage, usage. proposed so phase one operators not be lumped in with the analysis of phase three future operations. There is a lack of quality, reliable timely info shared with cultivators and public. Provisionals to annuals and how the secret document in existence the mnd and then the appendix G and now the EIR the entire pathway that has been tumultuous has lacked clear and consistent information sharing. We lack serious communication from the DCC that aligns with what the county is telling us.	Cumulative Impacts, Hydrology and Water Quality, Utilities and Service Systems

From: Bill Krawetz <billkrawetz@comcast.net>
Sent: Friday, September 1, 2023 11:28 AM
To: Public Comment@Cannabis
Subject: Comments on NOP for EIR of Commercial Cannabis Cultivation in Mendocino County.
Attachments: Cannabis groundwater pumping Navarro river study 2019.pdf; Impacts of Surface Water Diversions for Marijuna Cultivation on Aquatic Habitat in 4 NoCal watersheds.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Dear DCC,

The following are comments on what should be included in the EIR study. These items much be evaluated and properly dealt with for the EIR to be valid.

1. Illegal growers- The operations of these growers must be studied and accounted for. It is estimated there are significantly more illegal growers than legal growers. The local law enforcement team reported they only have the resources to deal with ~100 sites per year, yet there are tens of thousands growers. See attached article and highlights below:
   https://www.courier-journal.com/in-depth/news/crime/2021/12/17/mexican-drug-cartels-move-in-on-californias-shadow-marijuana-industry/6036056001/

   Highlights:
   Mendocino County Sheriff Matt Kendall told The Courier Journal there are as many as 10,000 illegal grows in his jurisdiction, a two-hour drive north of San Francisco. He tries to target the worst 100, which is all his small force can handle in a year.

   "We have international cartels successfully operating here" setting up multi-million dollar farm operations, said California Assemblyman Tom Lackey, R-Palmdale, a former highway patrolman.

   "They're poisoning our ground and stealing our water, and we have drought out here," he said.

   A glimpse at what he's dealing with: Christopher Wayne Gamble, who allegedly operated large illegal crops near the town of Willits, in central Mendocino County, is charged with murdering a 17-year-old boy and his father who came from Mexico seeking work, according to Mendocino County Superior Court records. detectives found the victims' headless bodies in April in a ditch under a pile of tires that had been set on fire.

   Illegal growers are using dangerous chemicals from Mexico that poison animals and contaminate soil.
   Armed criminal networks set up illegal grows on federal land in national forests.

Illegal cannabis used to make a nearly pure form of THC is linked to explosions that have burned children and killed adults.

Farmers once fetched up to $4,000 per pound, but a saturated market across the state has driven down prices to $400 or less. Illegal sellers can ship it to get triple the price on the East Coast, Sena said.

A decade ago, 20 acres with a house and barn would have sold for $200,000 or less. Now, it can fetch more than $1 million. "Almost everybody that grows dope up here is from San Jose,"

After doing flyovers, sheriff's investigators estimate there are a million pot plants on the valley floor(Covelo), an area about seven by eight miles. That's less than 2% of the county's landmass. Mexican drug cartels move in on California's shadow marijuana industry. The sheriff estimates that 95% are illegal

"Some of the marijuana being moved across the country is born on the back of slave labor," said Sena, who also heads up the Northern California Regional Intelligence Center. "Often the people brought in to do labor are mistreated" on illegal marijuana farms. Other farm workers, including young men used for sex and labor trafficking, weren't rescued in time. Some were forced to live in squalor without plumbing. Others ended up dead and many are missing, the sheriff said.

An average of more than 2 million cannabis plants were eradicated on federal land from 2007-2019 — more than a million of which was grown in California, Gabriel said.

2. Water impacts: Study the impacts of cannabis water usage on steam depletion and the impacts to wildlife and residents.
    a. CDFW study: "Impacts of Surface Water Diversions for Marijuana Cultivation on Aquatic Habitat in Four Northwestern California Watersheds" Included Mendocino County: See attached report. Highlights:
        i. Our results indicate that water demand for marijuana cultivation has the potential to divert substantial portions of streamflow in the study watersheds, with an estimated flow reduction of up to 23% of the annual seven day low flow in the least impacted of the study watersheds. Estimates from the other study watersheds indicate that water demand for marijuana cultivation exceeds streamflow during the low-flow period.
    b. Nature Conservancy/others study on Navarro River area. See attached report. Highlights:
        i. points out the linkage between reduction in streamflow with groundwater pumping. In the Navarro study wells 3/4 mile away from a stream have a big impact. The study seems to use actual sites but estimates of usage.
        ii. Cannabis wells cause a disproportionate amount of stream depletion. Cannabis well are less than 25% of total wells (18% of total) but caused over 50% of depletion. The study looks at both Cannabis and Residential uses
        iii. Residential uses cause ~5X depletion of cannabis. But there are approximately 4.3x more Residential well (1314 total) than cannabis wells (302 total)
            1. Comment: Comparing Residential use to cannabis use might be misleading. Residential use includes drinking, cooking, bathing, toilets, gardens, etc. Cannabis is one discretionary use.
        iv. Streamflow depletion increases nonlinearly when pumping within ¾ mile of stream. Most wells (over 50%) within this range
        v. Streamflow depletion worse in late summer when groundwater is a critical source of base flow to ecologically important streams. Residential and Cannabis use peak in Summer
        vi. Stream depletion mainly caused by well distance from stream and well usage. Subsurface properties such as transmissivity are next important

3. Fire Safe Road regulations: Commercial Cannabis Cultivation operations must adhere to and only be allowed to operate in locations that met the Fire Safe Regulations:

a. Summary of Updated State Minimum Fire Safe Regulations, Comments from Board of Forestry's Final Statement of Reasons August 17, 2022
b. Synopsis:
    i. The State Board of Forestry and Fire Protection (BOF) unanimously approved the updated State Minimum Fire Safe Regulations (FSR) at its August 17, 2022, meeting. These regulations retain the identical road regulations as in the current 2020 FSR. This includes 20 ft wide roads, dead-end roads no longer than 800 ft to 1 mile, as well as many other specifications. The BOF, as well as the California Attorney General's Office, decisively confirmed that the FSR apply to all existing roads, and cover access to as well as within a parcel. The Exception process must follow strict requirements with material facts to demonstrate Same Practical Effect within a development perimeter. For subpar public roads needing improvement to meet the FSR, it's up to the county to determine either if the county will pay or if it requires the applicant to pay, or if no upgrades are made, to prevent the development from proceeding.
c. Relevant Excerpts from the State Fire Safe Regulations and the Final Statement of Reasons.
    i. The State Board of Forestry and Fire Protection (BOF) unanimously approved minor revisions to the State Minimum Fire Safe Regulations (FSR) at its August 17, 2022, meeting and the Final Statement of Reasons (FSOR), for formal processing by Office of Administrative Law. These regulations govern all new development in the State Responsibility Area (SRA) as well as Very High Fire Hazard Severity Zone (VHFHSZ) in the Local Responsibility Area (LRA). The revised regulations retain the identical road regulations as are in the current 2020 FSR, including:
    ii. • Minimum 20 ft wide roads for all 2-way roads (two 10-ft wide traffic lanes excluding striping and shoulders)
    iii. • Dead end roads no longer than 800 ft, 1320 ft, 2640 ft or 1 mile, depending on smallest parcel served (i.e., ranging from 800 ft dead-end length limit if any parcel served is less than 1 acre, to 1 mile dead-end length limit if all parcels served are 20 acres or more)
    iv. • Grades of no more than 16%, up to 20% with mitigations
    v. • Specifications for curve radius, bridge weight ratings, gates, road surface, turnouts, turnarounds
    vi. • Length of 1-way roads no longer than 1/2 mile, plus other requirements including to connect with 2-way roads (i.e., minimum 20 ft wide) at each end
    vii. • Only 20 ft wide roads, not 10 ft wide driveways, can access any commercial facility
    viii. • Must provide for safe concurrent fire apparatus ingress and civilian evacuation, and unobstructed traffic circulation during a wildfire
d. Exceptions can be applied for by applicants within a parcel or development perimeter (e.g., on private roads), but only if applicants provide material facts demonstrating the Same Practical Effect within that perimeter as provided by the standards enumerated (see above) in the FSR (FSR § 1270.07; FSOR p. 593).
e. Local regulations must at minimum meet the criteria of the FSR. Local jurisdictions cannot apply exemptions not set forth in the FSR (such as exempting existing or pre-1991 roads as sought by Sonoma County in its 2020 ordinance, which the BOF accordingly refused to certify) (§FSR § 1270.05; FSOR p. 594).
f. Public roads must also meet the minimum FSR for any new development to occur. There is no mechanism specified in the FSR for Exceptions on public roads outside a development or parcel perimeter. BOF has previously explained that if improvements are needed to such public roads, it's up to the county to determine whether such improvements are paid for by the developer or the county (October 23, 2020, letter from BOF to Sonoma County Counsel). If not in compliance, then the new development cannot occur if accessed by subpar public roads.
g. The FSR apply equally to public and private roads (FSR § 1270.01(y); FSOR pp. 5-7). BOF has also reiterated a 2019 California Attorney General's letter confirming that the FSR apply to existing public access roads leading to a proposed development that are beyond the development perimeter (FSOR pp. 6-7). BOF reiterated these statements in response to and thus contradicting assertions in a May 27, 2022, letter to BOF from Rural County Representatives of California (RCRC). RCRC erroneously claimed

that the FSR only applied to the limited area within a parcel or development perimeter and not to existing roads outside the perimeter, misapplying the BOF definition of "Defensible Space". However, RCRC failed to note that the BOF definition of Defensible Space is limited to applicability of Exceptions, not to scope. Importantly, neither that definition nor Exceptions are included in nor limit the scope of the underlying code PRC 4290. Rather, BOF wrote both definitions to delineate a mechanism for requesting Exceptions within a parcel or development perimeter. RCRC wrongly tried to apply this specific narrow definition of Defensible Space – to reiterate, which definition is limited only to Exceptions in the FSR - to instead limit the scope, despite that scope was never so limited by BOF in the FSR as that would violate PRC 4290. Furthermore, as the vast majority of roads providing access to new development are outside a parcel/development perimeter, the entire Article 2 of the FSR, which encompasses extensive road specifications (i.e., road widths, curve radius, turnarounds, grade limits, bridge weight limits, dead-end road limits across multiple parcels, etc.), would be essentially meaningless if the FSR were limited to within a parcel or development perimeter (where the infrastructure is mainly driveways and occasionally a private road). Sonoma County should not rely on RCRC's flawed and indefensible argument in its May 27 letter, which was refuted by BOF in the FSOR (p.557).

h. It is important to understand that roads only need to meet the FSR for new development (residential, commercial, or industrial); roads do not need improvement for existing development. As the FSR have been state law since 1991, any new development after 1991 should have only been on roads meeting the FSR. Unfortunately, this was not always the case in Sonoma County.

i. The County must adhere to state law in the FSR for all new development. If an Exception is requested, it must follow the requirements of the FSR including with material facts supporting that it provides the Same Practical Effect as the standards enumerated in the FSR (§ 1270.07; FSOR, p. 593). As noted above, such Exceptions are limited to roads and driveways within a parcel or development perimeter. The County has violated the FSR and Exceptions provision on many approvals including several in 2021, approving new development accessed solely by subpar public roads, and stating that Exceptions were documented providing Same Practical Effect when in fact the public record confirmed that no such Exception documents exist. We hope going forward that the County will adhere to the FSR.

j. To assist counties, the BOF has agreed to work with CalFire leadership on training for CalFire employees and local jurisdictions on correct implementation of the FSR. Such training will benefit the County in streamlining its development approval processes, including correctly applying the FSR to existing roads both within and outside a parcel or development perimeter, and on preventing abuse of Exceptions which would undermine the intent of the FSR.

4. <u>The DCC NOP document provides little definition</u>:

   a. NOP states "The NOP provides sufficient information describing the Project and its potential environmental effects to allow recipients the opportunity to provide a meaningful response related to the scope and content of the EIR" and provides the following Project Description: PROJECT DESCRIPTION

      i. The DCC has issued approximately 608 provisional commercial cannabis cultivation licenses in Mendocino County. The Project consists of the DCC actions to approve annual licensing of such commercial cannabis cultivation operations in Mendocino County under California Code of Regulations, title 4, section 15002.The EIR will programmatically evaluate the environmental impacts of the DCC's annual licensing of commercial cannabis cultivation operations in the county as well as the environmental impacts of future licensed commercial cannabis cultivation operations.

   b. Considering the NOP is only 3 pages long and written at a very high level, it is difficult to impossible for the public to fully understand the full scope to properly comment.

Thanks
Bill Krawetz

Cannabis and residential groundwater pumping impacts on streamflow and ecosystems in Northern California

Environmental Research Communications

PAPER

Cannabis and residential groundwater pumping impacts on streamflow and ecosystems in Northern California

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Abstract

Cannabis is an emerging agricultural frontier, but due to its quasi-legal status its environmental impacts are poorly understood. Where cannabis is irrigated by groundwater, pumping can lead to streamflow depletion in surrounding streams which may impair other water users or aquatic ecosystems. Here, we investigate the impacts of groundwater pumping for cannabis irrigation at the scale of the watershed, the individual well, and the stream segment, and contextualize by comparing with residential groundwater use. Combining mapped cannabis cultivation and residential structure locations with grower reports of irrigation water sources, we develop distributed estimates of groundwater pumping and associated streamflow depletion caused by cannabis and residential users within the Navarro River Watershed in Northern California (USA). An estimated 73% of cannabis cultivation sites and 92% of residential structures in the watershed rely on groundwater, and groundwater abstraction leads to streamflow depletion during late summer when groundwater is a critical source of baseflow to ecologically important streams. However, streamflow depletion caused by cannabis cultivation is dwarfed by the impacts of residential use, which causes >5 times as much streamflow depletion and is concentrated close to ecologically important stream segments. Focusing on cannabis, a small number of wells (<25%) cause a disproportionate amount of depletion (>50%), and significant predictors for impacts of a well are the annual pumping rate, the distance to the closest stream, and the transmissivity between the well and the stream. Streamflow depletion increases nonlinearly when pumping occurs within 1.2 km of streams, and most cannabis and residential groundwater use is within this critical distance. Given the rapid increase in cannabis cultivation, these results indicate that potential streamflow depletion from groundwater irrigation of cannabis is a current and future concern, and will be superimposed on top of significant depletion already occurring due to residential use in the region studied.

1. Introduction

Cannabis (*Cannabis sativa* L.) cultivation has expanded rapidly in recent years in California and elsewhere, and with unknown impacts on water resources (Bauer *et al* 2015, Stoa 2015, Butsic *et al* 2018). While estimates of cannabis water use are highly uncertain due to a lack of data, previous work has found that cannabis is often cultivated close to sensitive aquatic habitats and irrigation requirements can exceed summer low flows in areas with substantial cultivation (Bauer *et al* 2015, Butsic and Brenner 2016). Accordingly, quantifying the environmental impacts of cannabis irrigation has been identified as a key research priority (Ashworth and Vizuete 2017).

Most previous work on cannabis cultivation has focused on surface water diversions (e.g. Bauer *et al* 2015). However, recent work indicates that in some regions such as Northern California, groundwater is the primary water source for most cultivators and therefore an underappreciated concern (Dillis *et al* 2019a, 2019b, Wilson *et al* 2019). One potential negative impact of groundwater pumping is reduced streamflow ('streamflow depletion') due to the capture of groundwater which otherwise would have discharged into a stream (Barlow *et al* 2018). Since groundwater provides a relatively stable and cool supply of water to streams, it is critical to the survival of aquatic organisms such as rare and endangered anadromous fish (Larsen and Woelfle-Erskine 2018, Greer *et al* 2019).

Here, we ask, *what are the potential impacts of ongoing groundwater pumping for cannabis cultivation in the Navarro River Watershed (California, USA) on streamflow and aquatic ecosystems*? We answer this question using an analytical depletion function, a newly developed tool for estimating streamflow depletion with low data and computational requirements (Zipper *et al* 2019a), to evaluate streamflow depletion caused by groundwater pumping for cannabis cultivation and contextualize this depletion via comparison to pumping for residential groundwater use. Specifically, we ask:

(1) At the watershed scale, how much streamflow depletion is potentially associated with groundwater pumping for cannabis cultivation, and how does it compare with pumping for residential groundwater use?

(2) At the well scale, how does streamflow depletion vary among pumping wells and what are the most important factors driving this variability?

(3) At the stream segment scale, what locations would pumping wells have the greatest negative impact on ecologically important stream segments?

2. Methods

2.1. Study site: Navarro River Watershed, CA

The Navarro River Watershed (816 km^2) is in Mendocino County, California, USA. Streamflow in the Navarro River is highly seasonal, and streamflow in late summer and early fall are dominated by baseflow (figure 1(a)). These cool groundwater inflows are critical for aquatic ecosystems including anadromous fish (section 2.1.2; Spence *et al* 2008, National Marine Fisheries Service 2016). However, there are significant long-term decreasing baseflow trends in August (-0.11 mm $decade^{-1}$), September (-0.11 mm $decade^{-1}$), and October (-0.45 mm $decade^{-1}$) based on the 1951–2018 water years, which coincide with the time of year when baseflow is particularly critical for aquatic ecosystems.

Timberland is the primary (~70%) land use in the rural Navarro River Watershed, followed by rangeland (~20%), agriculture (~5%), and limited residential areas (North Coast Regional Water Quality Control Board 2005). Irrigated agriculture has expanded since the 1960s, and 97% of traditional crop areas (mostly vineyards) use surface water for irrigation (McGourty *et al* 2013). The Navarro River Watershed is in the 'Emerald Triangle' region (Humboldt, Mendocino, and Trinity Counties), an area well known for significant cannabis cultivation. There is growing concern that cannabis cultivation is an expanding environmental stressor in the region (Carah *et al* 2015, Butsic *et al* 2018). While historical cannabis cultivation data are not available for the watershed, widespread but small-scale cultivation in the region began in the late 1960s, with further expansion in the 1980s due to rising prices (Raphael 1985, Corva 2014, Polson 2018). Key statewide legal changes leading to additional expansion in the region occurred in 1996, when Proposition 215 legalized medical cannabis, and 2016, when Proposition 64 legalized recreational cannabis. Recent estimates have found that the area under cultivation in Mendocino and Humboldt counties nearly doubled between 2012 and 2016 (Butsic *et al.* 2018).

2.1.1. Water use

We estimated the spatiotemporal distribution of groundwater use for cannabis cultivation and residential use in the Navarro River Watershed using a combination of existing datasets and new statistical models. These methods are described in detail in the supplemental information is available online at stacks.iop.org/ERC/1/125005/mmedia. Only 3% of traditional agricultural acreage in the watershed is irrigated using groundwater (McGourty *et al* 2013), so this water use was not considered in our analysis.

Cannabis cultivation locations were identified from high-resolution aerial imagery in a previously mapped dataset (Butsic and Brenner 2016, Butsic *et al* 2018). Based on data from annual grower reports received through the North Coast Regional Water Quality Control Board (NCRWQCB), we developed two statistical models to predict locations and amount of groundwater withdrawals for cannabis cultivation. These models (described in detail in the supplemental information) include a random forest model using site physical, hydrological, and infrastructure characteristics to determine which cultivation locations used groundwater for irrigation and a multiple linear regression model using cultivated area and growing conditions to predict the monthly amount of

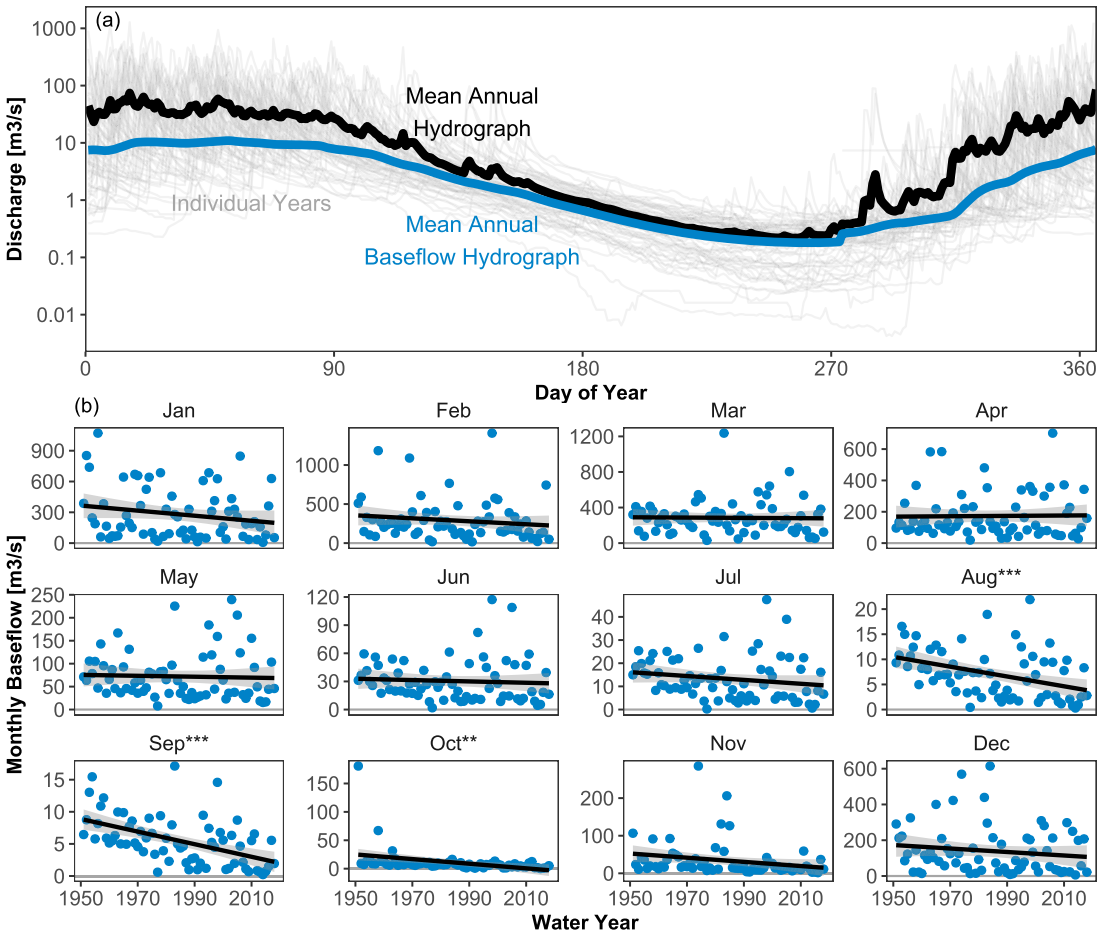

Figure 1. (a) Daily discharge (gray lines), mean daily discharge (black line), and mean daily baseflow (blue line) for the Navarro River (USGS gauge 11468000) for 1951–2018 water years, modified from Zipper *et al* (2018). (b) Mean monthly baseflow for 1951–2018 water years, with linear trend line in black. Linear trends are significant in starred months (** indicates $p < 0.01$; *** indicates $p < 0.001$). Note that *y*-axes differ between panels. Baseflow separation using (Nathan and McMahon 1990) digital filter.

irrigation applied at each site. After applying these models to the 411 parcels containing mapped cultivation sites, we predicted 302 parcels (73%) would use groundwater which is consistent with regional-scale estimates (Dillis *et al* 2019a). We used these pumping estimates as a representative monthly pumping schedule, which we then repeated for the full 50-year period of analysis.

To contextualize cannabis impacts, we also estimated the amount and impacts of residential groundwater use (i.e., homes with wells) using mapped residential structure locations (The Nature Conservancy, unpublished data) as described in the Supplemental Information. We screened out known points of surface water diversions from the California electronic Water Rights Information Management System (CA State Water Resources Control Board 2019 a), and estimate 1314 of 1423 residential structures (92%) in the Navarro River Watershed are groundwater-supplied, which is consistent with regional Resource Conservation District staff estimates that the overwhelming majority of residences use groundwater (personal comm., Linda MacElwee, Mendocino County Resource Conservation District). We estimated monthly water use for each property based on per capita water use data (CA State Water Resources Control Board 2019b) and average household size estimates (Mendocino County Water Agency 2010). Reported per capita water use spanned June 2014-February 2019, so we average monthly household water use across all years to generate a representative monthly pumping schedule, which we then repeated for the full 50-year period of analysis.

2.1.2. Stream ecological value

To identify streams with high ecological value, we used intrinsic habitat potential estimates for coho salmon (*Oncorhynchus kisutch*) in Northern California from Agrawal *et al* (2005). We selected coho salmon as the species of interest due to their high sensitivity to stream temperature conditions during late summer low flows (Welsh *et al* 2001), which are strongly dependent on groundwater inflow (Spence *et al* 2008, Gleeson and Richter 2018), and their status as an endangered species at state and federal levels (National Marine Fisheries Service 2012). The intrinsic habitat potential represents the likelihood (0–1) that a stream segment will have suitable habitat for a given species based on the channel gradient, valley width, and discharge. Following regionally-developed

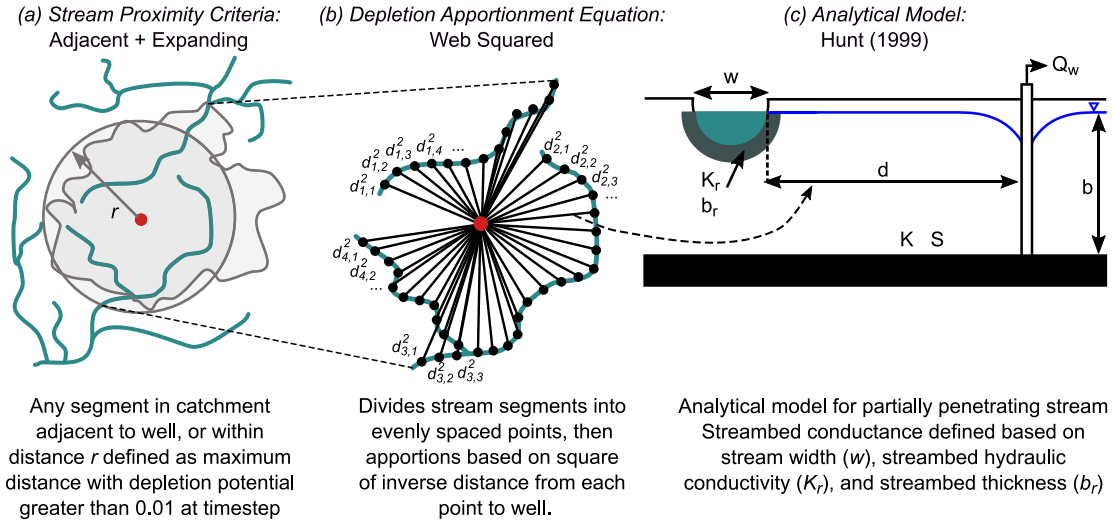

Figure 2. Diagram showing components of analytical depletion function: (a) stream proximity criteria, (b) depletion apportionment equations, and (c) analytical model.

standards (National Marine Fisheries Service 2016), we used a threshold of ⩾0.7 to indicate high quality habitat potential (figure 4). We aggregated the raw stream segment estimates of intrinsic habitat potential (NOAA; mean segment length = 85–126 m depending on species) to match segments in the US National Hydrography Dataset (NHD; mean segment length = 1560 m) with any NHD segment containing a high potential NOAA segment classified as high potential.

2.2. Calculating streamflow depletion

2.2.1. Analytical depletion function overview

We used an analytical depletion function (figure 2) to estimate the quantity and timing of streamflow depletion from cannabis and residential groundwater use. Analytical depletion functions, developed in Zipper *et al* 2019a, combine: (i) stream proximity criteria, which determine the stream segments that may be affected by a well; (ii) a depletion apportionment equation, which calculates the relative proportion of total streamflow depletion occurring in each stream segment meeting the proximity criteria; and (iii) an analytical model, which estimates the total streamflow depletion for each stream segment which is then scaled using the depletion apportionment results. The output of an analytical depletion function is the streamflow depletion in each stream segment in response to a given well.

Based on previous work comparing analytical depletion functions for the region (Zipper *et al* 2019a), we used the 'Adjacent + Expanding' stream proximity criteria (figure 2(a)), the web squared depletion apportionment equation (figure 2(b); equation S1; Zipper *et al* 2018), and the Hunt (1999) model (equation S2). To simulate monthly pumping schedules developed in section 2.1, we used the superposition approach described in Jenkins (1968). This analytical depletion function was tested against 49 other analytical depletion functions and found to produce the most accurate estimates of depletion for the Navarro River Watershed across a number of performance criteria (Zipper *et al* 2019a). Analytical depletion functions were implemented using the streamDepletr package (Zipper 2019) for R, and described in detail in the Supplemental Information and Zipper *et al* 2019a.

2.2.2. Analytical depletion function inputs

Analytical depletion functions require input data describing stream network geometry , the well, and hydrostratigraphic conditions. See the Supplemental Information for a detailed description of these inputs.

For inputs describing the stream network geometry, we used the National Hydrography Dataset to map stream locations, and an empirical relationship between drainage area and stream width developed in Zipper *et al* 2019a. The total extent of our domain included the Navarro River Watershed and adjacent watersheds (figure S2) so that wells could have impacts beyond the watershed borders.

For inputs describing the well, we used the spatial locations and pumping schedules for cannabis cultivation and residential structures described in section 2.1. Well screen depths were not reported in the NCRWQCB reports used to model well locations and pumping rates, so we used the screened interval for the closest Well Completion Report from the California Department of Water Resources (https://dwr.maps.arcgis.com/apps/webappviewer/index.html). For the synthetic wells used to map the sensitivity of streams to pumping

throughout the watershed (section 2.3; figure S2), we defined the screen length as the mean of production wells in the well completion report database and set the top of the screen at the estimated water table elevation.

Though detailed measurements of inputs describing hydrostratigraphy are not available from within the Navarro River Watershed, we synthesize data from nearby watersheds in the same regional geological setting to inform our study. In the nearby Elder Creek watershed, Dralle *et al* (2018) describe thin soils overlying a fractured and saturated bedrock system driving hillslope hydrology in the region, and in lowland portions of the domain mapped unconsolidated sedimentary aquifers are present along the Navarro River and coastal areas (CA Department of Water Resources (2016)). Accordingly, we adopt a two-layer conceptual model in which fractured bedrock is overlain by unconsolidated sediment of variable thickness corresponding to the bedrock depth (Hengl *et al* 2014, 2017; figure S2). In hillslopes, this top layer is thin and effectively ignored in our streamflow depletion calculations because the top layer is above the water table and therefore not considered in our calculations of effective transmissivity (see below). In low-lying areas along the Navarro River and coast, the top layer is thicker (up to ~35 m) and represents the alluvial aquifer. We define the top layer's hydraulic conductivity as 4.5×10^{-3} m s^{-1} based on pumping tests from the alluvium around the Russian River (Su *et al* 2007), a value which is also consistent with surficial soil estimates of hydraulic conductivity from Dralle *et al* (2018). Complete hydrostratigraphic properties for each of these layers are defined in table S2.

To calculate effective transmissivity and effective storativity, we averaged transmissivity and storativity between each well location and the closest point to that well on each stream segment, meaning that these inputs are unique for each well-stream combination (equations S5–S7). We followed Reeves *et al* (2009) to estimate streambed conductance (equation S3) using the hydraulic properties of the aquifer at the location of each stream segment. In this approach, streambed conductance is a lumped empirical parameter accounting for various aspects of the real world which are not addressed in analytical models including streambed properties, anisotropy, and stream-aquifer geometry (Kollet and Zlotnik 2003, Glose *et al* 2019). Groundwater recharge is not a necessary consideration for this study because recharge does not affect either the distribution or magnitude of streamflow depletion unless the pumping itself leads to a change in recharge, which we assume is not the case here (Bredehoeft *et al* 1982, Feinstein *et al* 2016).

2.3. Quantifying watershed-, well- and stream-scale impacts

For watershed-scale impacts, we used the analytical depletion function to estimate monthly cannabis and residential streamflow depletion in the first, 10th, and 50th year after the onset of pumping in each of the mapped groundwater withdrawal locations for cannabis cultivation and residential use. Streamflow depletion is challenging to quantify (Barlow and Leake 2012) and no known measurements exist within the watershed for validation. Furthermore, since we do not know the year at which pumping began for each withdrawal point, we are not intending to reproduce historical or project future streamflow depletion patterns, but rather evaluate the magnitude of streamflow depletion for different pumping timescales caused by current groundwater use. The output of the analytical depletion function was the streamflow depletion caused by each well in each stream segment within our domain, which we compared to average baseflow over the past 20 water years separated using the Nathan and McMahon (1990) digital filter to evaluate impacts relative to current hydrologic conditions.

For well-scale impacts, we evaluated whether some cannabis cultivation parcels contributed disproportionately to depletion by ranking the total depletion caused by each well across all stream segments in September after 1, 10, and 50 years of pumping. We then quantified the factors which drove impacts at the well-scale using R^2 partitioning (Lindeman *et al* 1979) as implemented in the relaimpo package for R (Grömping 2006). Specifically, for each year tested (1, 10, 50 years), we built a multiple linear regression model predicting a well's total capture fraction as a function of annual water use, distance to closest stream segment, effective transmissivity between the well and the closest stream segment, streambed conductance of the closest stream segment, and the depth to bedrock at the well. We then used ANOVA to identify significant predictors ($p < 0.05$) of depletion at each timestep and evaluated the relative contribution of each significant predictor to the total R^2. We used a 1000-sample bootstrapping approach to generate mean and confidence intervals for the relative importance of each significant predictor variable.

For stream segment-scale impacts, we focused on streams with high ecological value (section 2.1.2). Following Feinstein *et al* (2016), we designed a grid of synthetic pumping wells at 1 km spacing ($n = 787$; figure S2) which we tested one-at-a-time using the mean monthly pumping schedule from all cannabis cultivation sites to simulate the impacts of pumping for 1, 10, and 50 years. These synthetic wells are meant to test pumping impacts on streamflow in a systematic manner throughout the entire domain and do not necessarily represent locations where pumping is currently occurring. We then summed the impacts from each well on streams of high ecological value and interpolated results to 150m resolution using inverse distance weighted interpolation as implemented in the gstat package for R (Gräler *et al* 2016) to map the spatial distribution of potential impacts

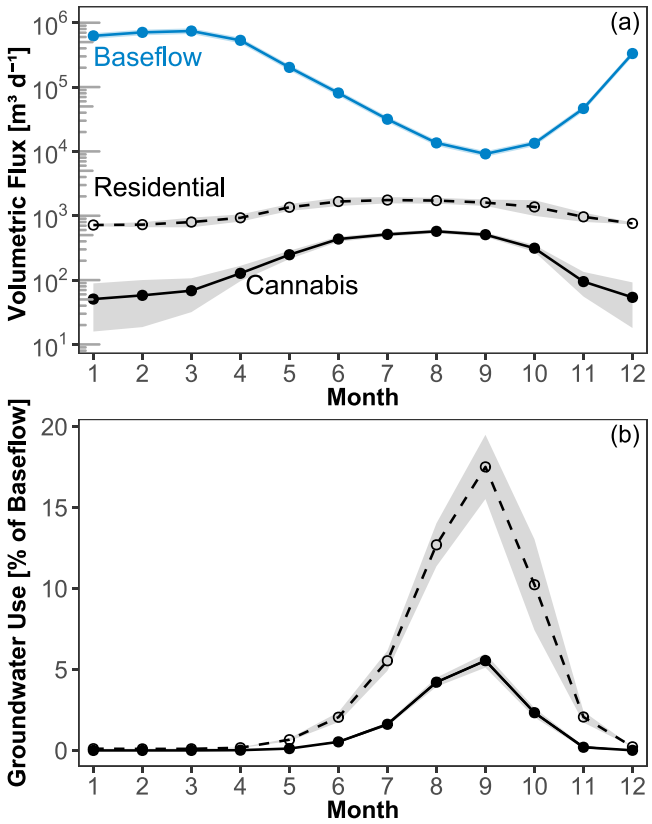

Figure 3. Estimated monthly cannabis and residential groundwater use, shown (a) as a volume and (b) as a percentage of mean monthly baseflow (1999–2018 water years). Shaded ribbon show +/−1 standard deviation of estimated water use.

on high ecological value streams. To determine the distance from a stream at which effects are greatest, we created buffers of 100–3000 m at an interval of 100 m around each high-value stream segment. Within each of these buffers, we averaged the values within this distance of the stream from the interpolated rasters. To identify the distance at which impacts of pumping begin to increase non-linearly, we identify the maximum of the second derivative of a smoothed relationship between depletion from high potential streams and buffer distance surrounding each high-potential stream.

3. Results and discussion

3.1. Cannabis and residential groundwater use

Both cannabis and residential properties use substantial amounts of groundwater with strong seasonality in estimated groundwater abstraction. Groundwater use for cannabis production within the Navarro River Watershed is minimal in the wet winter months and peaks in August at 572 m^3 d^{-1} (figure 3(a)), and estimated annual abstractions total 92,945 m^3. Residential groundwater use has a similar seasonal pattern but a much greater magnitude, peaking in July at 1753 m^3 d^{-1} (figure 3(a)). The lowest residential water use month (January) has greater groundwater withdrawals than the highest cannabis water use month, and total annual abstractions for residential use (437,786 m^3) are 4.7 times greater than abstractions for cannabis. As a percentage of baseflow, both cannabis and residential groundwater use is highest in September at 5.5% and 17.5% of mean monthly baseflow, respectively (figure 3(b)). This is the month where baseflow is lowest, affected by a significant decreasing trend, and most important for salmon habitat (figure 1).

The larger groundwater use by residential properties is driven by two factors which vary seasonally. In the summer, overall residential use is higher than cannabis use even though cannabis has a higher per-well abstraction rate because there are more residential pumping locations in the watershed than groundwater-irrigated cannabis cultivation sites (1314 residential structures compared to 302 cannabis parcels using groundwater). If the number of cannabis parcels increased to match the number of residential structures, groundwater abstraction for cannabis would exceed residential use for June-September. In the winter, residential water use is greater than that of cannabis because cannabis water use is negligible outside of the summer growing season, while residential properties have ongoing water use during the winter months due to

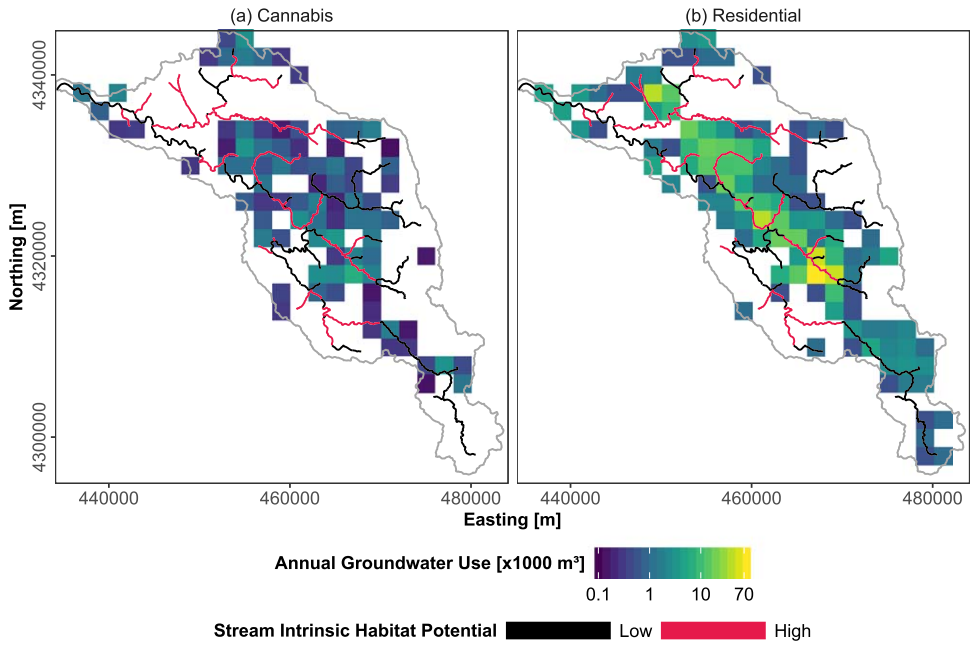

Figure 4. Map of intrinsic habitat potential for coho salmon within the Navarro River Watershed, with estimated annual (a) cannabis and (b) residential groundwater use (aggregated from points to 2km resolution to protect individual privacy). White areas within the watershed boundary have no estimated groundwater use. Habitat potential for steelhead salmon are shown in figures S3–S5.

climate-insensitive indoor water requirements such as cooking and cleaning (Gato *et al* 2007, Breyer *et al* 2012, Zipper *et al* 2017).

Spatially, residential groundwater use is more clustered along the river than cannabis groundwater use, including many streams with high salmonid habitat potential (figure 4). The spatial distribution of residential use corresponds with the locations of most of the towns in the flatlands along the Navarro River (e.g., Boonville, Philo, Navarro). Cannabis cultivation is much more diffuse within the watershed, primarily concentrated in the middle reaches of the watershed (figure 4(a); Butsic *et al* 2017, Butsic *et al* 2018).

3.2. Watershed scale impacts

Streamflow depletion associated with both cannabis and residential groundwater use (figure 5) follows a similar seasonal pattern to water withdrawals (figure 3), with a slight time lag due to the delay between groundwater pumping and streamflow depletion. Streamflow depletion associated with cannabis production is largest in September both volumetrically (figure 5(a); 93, 139, and 176 $m^3\ d^{-1}$ after 1, 10, and 50 years of pumping respectively) and as a percentage of monthly baseflow (figure 5(b); 1.0%, 1.5%, and 1.9% after 1, 10, and 50 years of pumping respectively) over our entire study period. This is offset from the month of peak water use, which is August (figure 3(a)). Peak monthly streamflow depletion associated with residential groundwater use is substantially larger than that of cannabis (figure 5(a)), at 485 $m^3\ d^{-1}$ after 1 year (5.2x greater than cannabis), 700 $m^3\ d^{-1}$ after 10 years (5.0× greater), and 854 $m^3\ d^{-1}$ after 50 years (4.9x greater). Like cannabis, the impacts are largest relative to baseflow in September (5.3% after 1 year, 7.6% after 10 years, and 9.3% after 50 years) which is when baseflow is lowest and the primary component of streamflow (figure 5(b)). These impacts approach the presumptive standard of 10% of monthly baseflow which is suggested to sustain aquatic ecosystems (Gleeson and Richter 2018).

The degree to which streamflow depletion caused by cannabis or residential pumping may affect aquatic ecosystems is a function of the streamflow in a given year, which is driven by interannual weather variability. For example, in a dry or average year, reductions in flow caused by groundwater pumping are occurring during a time in which flow is already below the state aquatic baseflow standard (figures 6(a)–(b)), which is defined by the California Cannabis Cultivation Policy as median August flow over the period of record (CA State Water Resources Control Board 2017). In contrast, during a wet year, streamflow remains greater than the aquatic baseflow standard even when potential pumping impacts are considered (figure 6(c)). During the period of record, there were five years (1951, 1996, 1997, 2003, and 2011) in which baseflow would have dropped below the aquatic baseflow standard if additional pumping equal to the present rates occurred for one year prior, indicating that managing the impacts of streamflow depletion may be most critical when flow is near aquatic ecosystem thresholds.

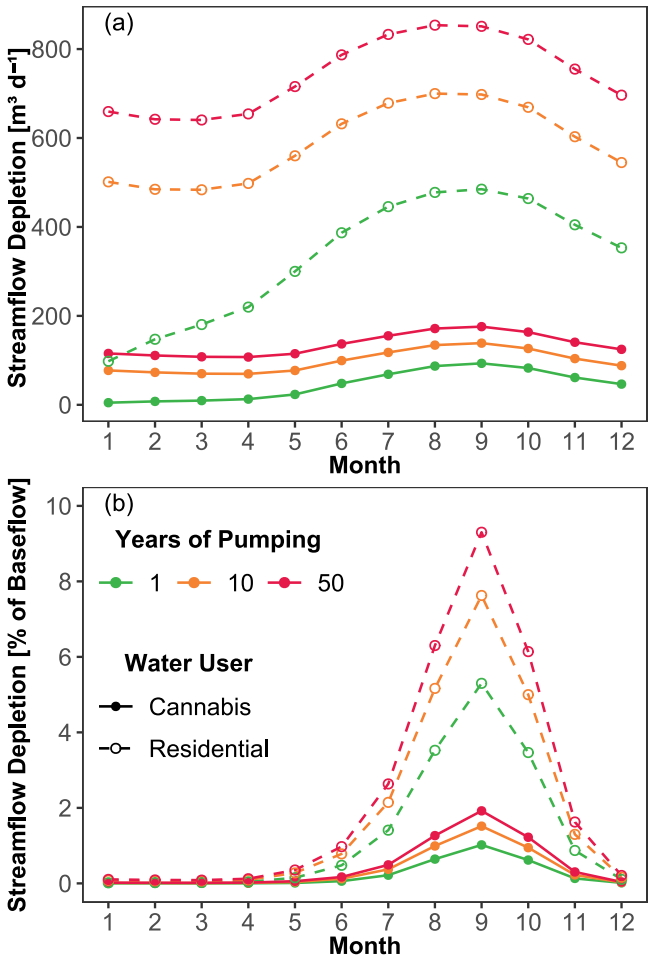

Figure 5. Streamflow depletion (within the Navarro River Watershed only) caused by groundwater pumping for cannabis cultivation and residential use after 1, 10, and 50 years of pumping, expressed (a) volumetrically and (b) as a percentage of mean monthly baseflow (1999–2018 water years).

Since historical data about the onset of pumping is not available, we are not able to attribute either long-term trends in baseflow (figure 1) or specific exceedance events (figure 6) to historical cannabis cultivation activities, residential development, or other factors such as climate change. However, our results show that a sizeable portion of impacts occur shortly after the onset of pumping. For example, 52.8% and 56.8% of long-term (50 year) depletion in September is already present the year pumping begins for cannabis and residential use, respectively (figure 5). Since the recovery from depletion occurs as an inverse of the timescale of depletion impacts (Jenkins 1968, Barlow and Leake 2012), this indicates that the hydrological system is highly sensitive to potential new pumping impacts, but also may recover quickly if pumping is reduced or halted in certain areas.

3.3. Well scale impacts

Our well-scale assessment of cannabis impacts indicates that a relatively small number of wells have a disproportionate impact on overall watershed-scale depletion. After 1 year of pumping, 50% of the depletion in the Navarro River Watershed can be attributed to only 32 wells (10.6% of estimated groundwater pumping wells in the Navarro; figure 7(a)). After 10 and 50 years, the number of wells causing 50% of depletion increases to 53 (17.5%) and 72 (23.8%), respectively (figure 7(a)). In year 1, only ~50% of well locations have any appreciable depletion (figure 7(a)). These results lend support to targeted conservation measures and the importance of well location, as removing or reducing pumping rates from a small subset of wells could have outsize environmental benefits, particularly at short timescales (e.g., within a single year).

Water use, distance from the well to the closest stream, and the effective transmissivity between a well and the closest stream are the primary predictors of the amount of depletion caused by a well, while streambed conductance and depth to bedrock at the well were not significant predictors. The relative importance of predictors changes through time, indicating shifting drivers of variability in capture fraction at different timescales. The predictive skill of water use increases through time, which is partially counteracted by a decrease

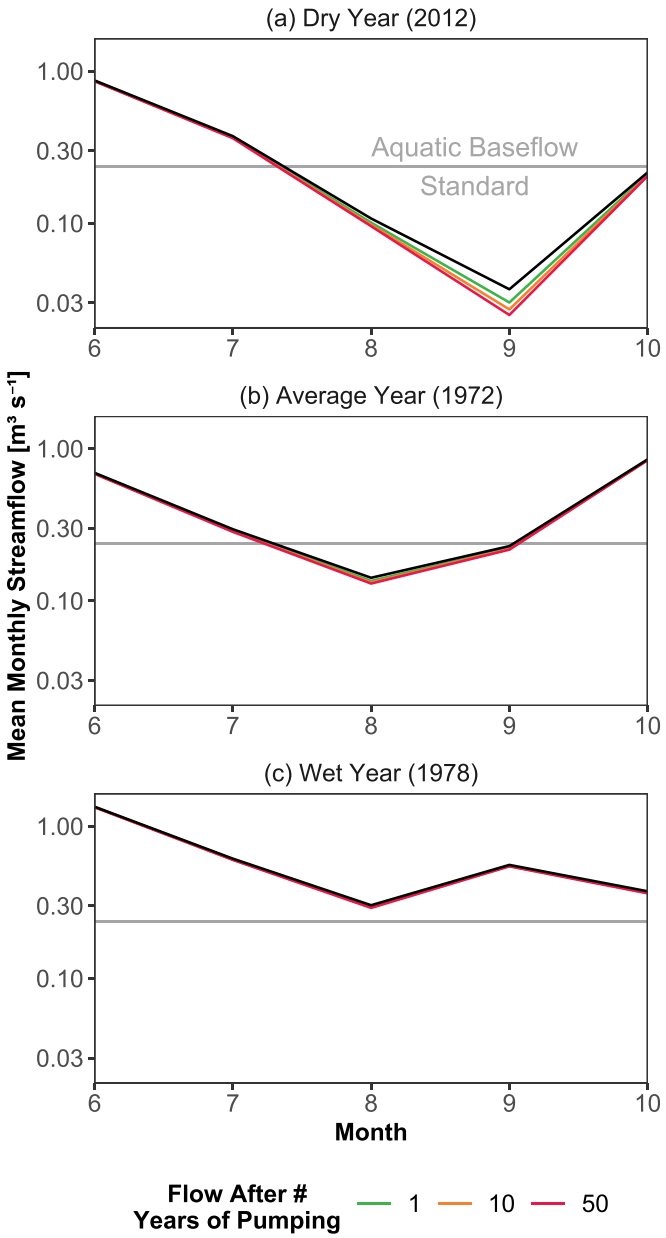

Figure 6. Measured streamflow (black line) and streamflow remaining after 1, 10, and 50 years of depletion (colored lines) from combined cannabis and residential pumping, shown relative to monthly flow in (a) a dry year, 2012, (b) an average year, 1972, and (c) a wet year, 1978. The gray horizontal lines shows the aquatic baseflow standard for the Navarro River from the California Cannabis Cultivation Policy, which is defined as the median August flow over the period of record (CA State Water Resources Control Board 2017). Note log-scale on y-axis.

in the predictive power of transmissivity. The decrease in the importance of transmissivity through time is indicative of the system coming to a new dynamic equilibrium of the source of water to the wells, which is relatively insensitive to hydrogeological properties (Zipper *et al* 2019a, Barlow and Leake 2012). While our conceptual model assumed two homogeneous layers, the decreasing importance of transmissivity through time would likely be true even with heterogeneous hydrostratigraphy because the decreasing predictive power of transmissivity results from the transition from groundwater depletion to streamflow depletion as the primary source of water to wells (Barlow and Leake 2012). In contrast, distance to the closest stream has relatively steady predictive skill in all years, indicating that this may be a consistently useful predictor across all timescales.

3.4. Stream segment scale impacts

Due to the large importance of the well-stream distance (section 3.3), pumping close to stream segments with high habitat potential has the largest potential negative environmental impacts. All else being equal, streamflow depletion would have larger negative impacts in smaller stream segments with lower flow. Portions of the landscape with strong effects on high potential stream segments include much of the middle reaches of the

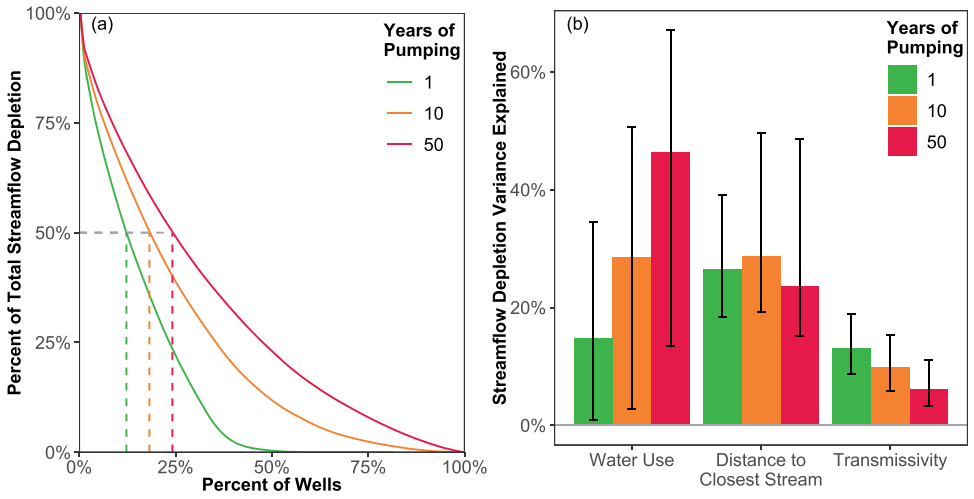

Figure 7. (a) Cumulative distribution functions of the total streamflow depletion accounted for as a function of the percentage of total groundwater pumping wells in September of year 1, 10, and 50 of pumping scenarios. Dashed lines annotate the percent of wells accounting for 50% of the total streamflow depletion at each time interval. (b) Relative importance of significant predictors for predicting cumulative streamflow depletion caused by a well across all stream segments in September of year 1, 10, and 50. Water use is annual estimated pumping rate for that well [$m^3\ yr^{-1}$] and transmissivity is the bulk transmissivity between the well and the closest stream [$m^2\ d^{-1}$]. Bars show mean and errorbars show 95% confidence interval from 1000-sample bootstrap.

Navarro River (figures 8(a)–(c)) which is coincident with locations where significant groundwater use occurs for residential structures (figure 4(b)) and, to a lesser degree, cannabis cultivation (figure 4(a)). While the portion of the landscape where pumping harms high potential streams expands through time, across the entire study period there is a nonlinear increase in depletion caused by wells within 1.2 km of a stream segment (figures 8(d)–(f); S6), indicating that a distance of 1.2 km of high potential stream segments may be a critical threshold for management for both short-term and long-term sustainability, especially near headwater streams. Wells which are screened in alluvial materials tend to have the largest impact on high-potential streams (figures 8(d)–(f)), indicating that the magnitude and timing of these impacts may be sensitive to estimates of alluvial hydrostratigraphic properties. Since the alluvial sediment is thickest in low-lying areas along the stream valleys (figure S2), this likely contributes to the nonlinear increase in streamflow depletion for wells within 1.2 km of the stream.

3.5. Management implications

Our results show that there is likely significant streamflow depletion in streams with high habitat potential caused by both cannabis and residential groundwater use in the Navarro River Watershed, with shifting drivers of impacts and implications through time. Over half of the long-term streamflow depletion manifests within a single year of the start of our pumping simulations (figure 5), and impacts at short timescales is most strongly influenced by the proximity of a well to a stream (figure 7) with nonlinearly increasing impacts within a distance of 1.2 km (figure 8). Over long timescales, the primary driver of impacts for a given well is the annual water use (figure 7), though impacts still increase nonlinearly within 1.2 km regardless of pumping rate (figure S6). While the exact timing and quantity of streamflow depletion may vary locally with refined estimates of hydrostratigraphic properties or more precise pumping schedules, our results broadly show the relative importance of cannabis and residential groundwater use within a year and across decades.

This suggests that the area within 1.2 km of the stream network is a critical management area (figure 9). Overall, 233 of the 302 parcels (77%) predicted to use groundwater for cannabis cultivation are within 1.2 km of a stream segment, and these parcels are more frequently close to stream segments with high habitat potential than not (figure 9(b)). Residential groundwater use is also frequently close to streams, with 89% of residential groundwater use within 1.2 km of any stream and 67% of residential groundwater use near a high habitat potential stream (figure 9(c)). While our results focused primarily on cannabis, our approach could be used to quantify impacts of groundwater withdrawals for other reasons. As cannabis cultivation expands in the region, its impacts will be an additional stress on top of ongoing residential groundwater use and direct surface water withdrawals for traditional agriculture. Total surface water withdrawals for traditional agriculture within the Navarro River Watershed were estimated in 2009 as approximately $2 \times 10^6\ m^3\ yr^{-1}$ (McGourty *et al* 2013), which exceeds combined cannabis and residential groundwater abstractions estimated here by a factor of 4.

More broadly, we find that analytical depletion functions are a useful tool for screening-level assessments of groundwater pumping impacts on streams. The ongoing legalization of cannabis will require new and revised

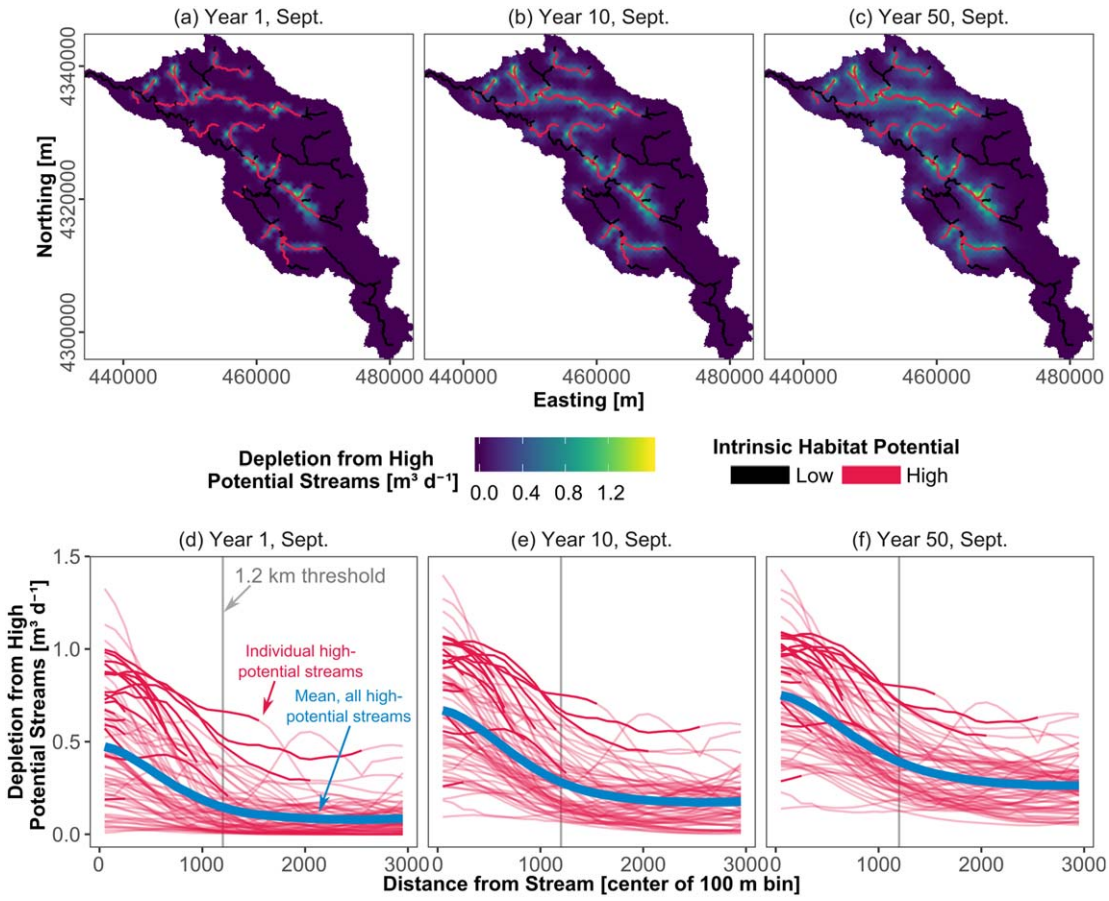

Figure 8 (a)–(c) Volumetric streamflow depletion that would occur from stream segments with high intrinsic habitat potential after 1, 10, and 50 years of pumping for an average cannabis cultivation site at different locations on the landscape. (d)–(f) Mean streamflow depletion from high intrinsic habitat potential streams as a function of distance from the stream; each red line corresponds to a high potential stream segment, and the blue line is the mean of all high potential segments. Dark red lines indicate distances in which wells are screened all or partly in alluvial materials. The vertical gray line indicates the critical 1.2 km distance within which impacts increase nonlinearly (section 3.4).

regulations to protect water and other environmental resources; in the USA, these protections will likely manifest at the local level due to a lack of federal regulation (Owley 2017, Short Gianotti *et al* 2017). Given the paucity of subsurface data available in most watersheds, the rapidity with which cannabis production is expanding (Butsic *et al* 2018), and the local scope at which cannabis is likely to be managed (Owley 2017), it is essential to provide accurate decision support resources with minimal time, data, and computational requirements. We show that analytical depletion functions can identify areas of potential concern for groundwater pumping (e.g., figures 8, 9) which could be used to flag groundwater withdrawal locations for further investigation or targeted conservation measures. Due to the low computational requirements relative to numerical models, analytical approaches are well-suited for integration into decision support tools (Reeves *et al* 2009, Huggins *et al* 2018, Colorado Alluvial Water Accounting System), and analytical depletion functions help overcome many of the limitations identified previously for standalone analytical models such as the inability to simulate multiple and/or sinuous streams.

4. Conclusions

In this study, we evaluate and contextualize the potential impacts of cannabis groundwater use at the watershed, well, and stream segment scales in the Navarro River Watershed (California, USA). We find that cannabis pumping has an important impact on streamflow during the dry season but is dwarfed by streamflow depletion caused by residential groundwater use which is 5x greater. However, cannabis pumping can be considered a new and expanding source of groundwater depletion which will further deplete summer baseflow already stressed by residential water use and traditional agriculture. At the well scale, we find that a small number of wells contribute disproportionately to streamflow depletion, particularly over short timescales; and that relatively easy-to-obtain input data (annual water use and distance to stream) are the primary factors related to pumping impacts on streamflow, with increasing importance of water use through time. Subsurface properties such as transmissivity are most important shortly after

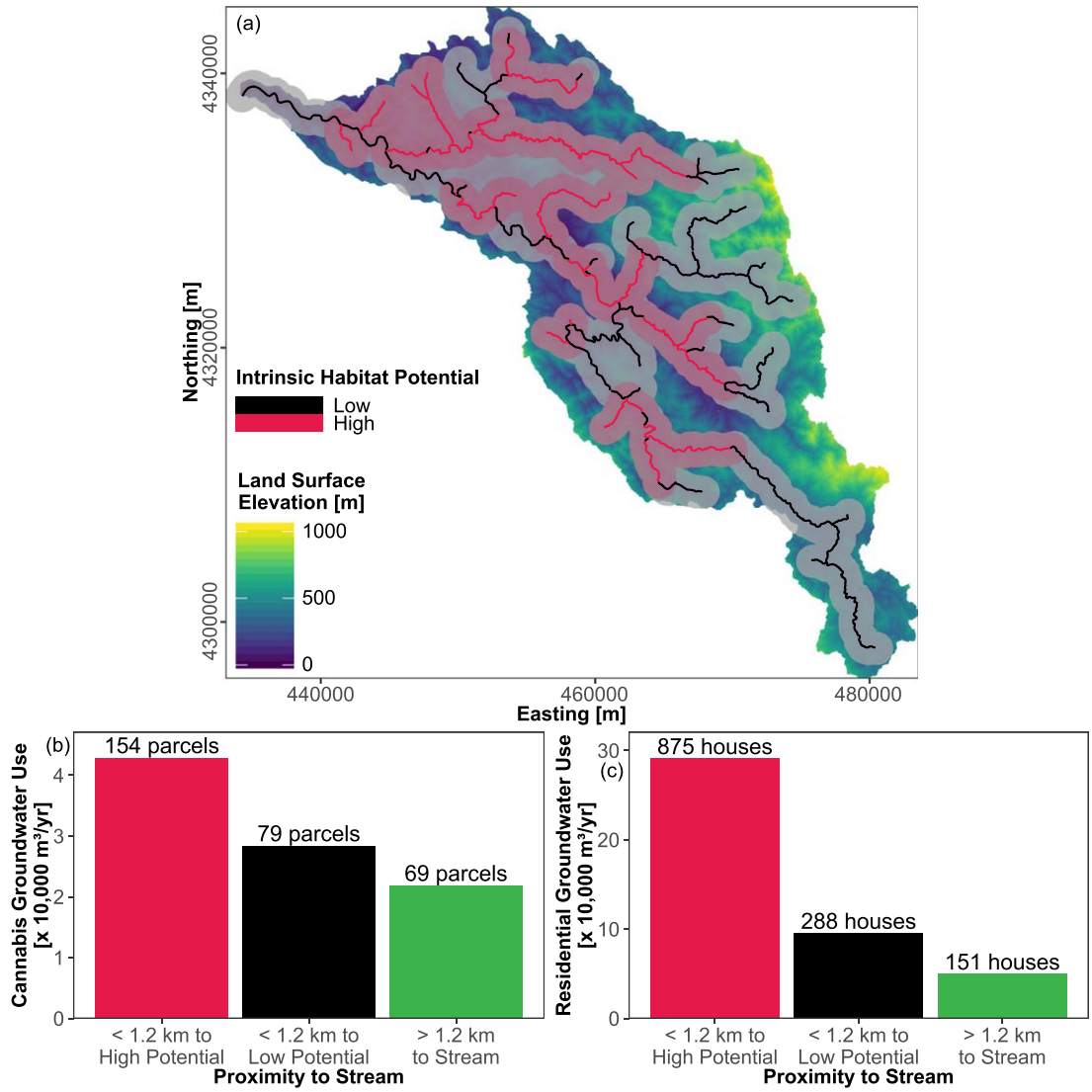

Figure 9. (a) Map showing areas within 1.2 km of stream segments with high intrinsic habitat potential (red line with red buffer) and low intrinsic habitat potential (black line with gray buffer), which was identified as a critical distance threshold for pumping impacts (figure 8, figure S6). (b), (c) Estimated annual groundwater pumping for (b) cannabis irrigation and (c) residential use occurring within 1.2 km of a high potential stream segment, within 1.2 km of a low potential stream segment, and further than 1.2 km from a stream. Note that (b) and (c) have different y-axes.

the onset of pumping and decrease in importance through time. We also show that pumping within a threshold of 1.2 km of sensitive stream segments has a disproportionately high impact, particularly at short (annual to decadal) timescales. Overall, these results indicate that the emerging cannabis agricultural frontier is likely to increase stress on both surface water and groundwater resources and groundwater-dependent ecosystems, particularly in areas already stressed by other groundwater users.

Acknowledgments and Data

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RESEARCH ARTICLE

Impacts of Surface Water Diversions for Marijuana Cultivation on Aquatic Habitat in Four Northwestern California Watersheds

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Data Availability Statement: Most data used are available via public sources (USGS gage data, EWRIMS, and Google Earth), but specific spatial locations of marijuana grows cannot be shared due to legal and privacy concerns. Summary data and all methods/information needed to replicate the study are included in the manuscript. Plant counts and greenhouse counts and measurements for all watersheds are included as Supporting Information (excel spreadsheets).

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Abstract

Marijuana (*Cannabis sativa* L.) cultivation has proliferated in northwestern California since at least the mid-1990s. The environmental impacts associated with marijuana cultivation appear substantial, yet have been difficult to quantify, in part because cultivation is clandestine and often occurs on private property. To evaluate the impacts of water diversions at a watershed scale, we interpreted high-resolution aerial imagery to estimate the number of marijuana plants being cultivated in four watersheds in northwestern California, USA. Low-altitude aircraft flights and search warrants executed with law enforcement at cultivation sites in the region helped to validate assumptions used in aerial imagery interpretation. We estimated the water demand of marijuana irrigation and the potential effects water diversions could have on stream flow in the study watersheds. Our results indicate that water demand for marijuana cultivation has the potential to divert substantial portions of streamflow in the study watersheds, with an estimated flow reduction of up to 23% of the annual seven-day low flow in the least impacted of the study watersheds. Estimates from the other study watersheds indicate that water demand for marijuana cultivation exceeds streamflow during the low-flow period. In the most impacted study watersheds, diminished streamflow is likely to have lethal or sub-lethal effects on state-and federally-listed salmon and steelhead trout and to cause further decline of sensitive amphibian species.

Introduction

Marijuana has been cultivated in the backwoods and backyards of northern California at least since the countercultural movement of the 1960s with few documented environmental impacts [1]. Recent increases in the number and size of marijuana cultivation sites (MCSs) appear to be, in part, a response to ballot Proposition 215, the Compassionate Use Act (1996). This California law provides for the legal use and cultivation of medical marijuana. In 2003, legislation was passed in an attempt to limit the amount of medical marijuana a patient can possess or

Competing Interests: The authors have declared that no competing interests exist.

cultivate (California State Senate Bill 420). However, this legislation was struck down by a 2010 California Supreme Court decision (*People v. Kelly*). As a result of Proposition 215 and the subsequent Supreme Court ruling, the widespread and largely unregulated cultivation of marijuana has increased rapidly since the mid-1990s in remote forested areas throughout California [2]. California is consistently ranked highest of all states for the number of outdoor marijuana plants eradicated by law enforcement: from 2008–2012 the total number of outdoor marijuana plants eradicated in California has ranged from 53% to 74% of the total plants eradicated in the United States [3]. In spite of state-wide prevalence, there is not yet a clear regulatory framework for the cultivation of marijuana, and from an economic viewpoint there is little distinction between plants grown for the black market and those grown for legitimate medical use [4].

Northwestern California has been viewed as an ideal location for marijuana cultivation because it is remote, primarily forested, and sparsely populated. Humboldt, Mendocino, and Trinity Counties, the three major counties known for marijuana cultivation in Northwestern California [5], comprise 7% (26,557 km^2) of the total land area of the state of California. However, their combined population of 235,781 accounts for only 0.62% of the state's total population (United States Census Data 2012). Humboldt County, with an area of 10,495 km^2, has over 7689 km^2 of forestland comprising more than 70% of its land base. More importantly, Humboldt County has 5,317 km^2 of private lands on over 8,000 parcels zoned for timber production [6]. This makes Humboldt County a feasible place to purchase small remote parcels of forestland for marijuana cultivation.

The broad array of impacts from marijuana cultivation on aquatic and terrestrial wildlife in California has only recently been documented by law enforcement, wildlife agencies, and researchers. These impacts include loss and fragmentation of sensitive habitats via illegal land clearing and logging; grading and burying of streams; delivery of sediment, nutrients, petroleum products, and pesticides into streams; surface water diversions for irrigation resulting in reduced flows and completely dewatered streams [2,7–10]; and mortality of terrestrial wildlife by rodenticide ingestion [11,12]. Though these impacts have been documented by state and federal agencies, the extent to which they affect sensitive fish and wildlife species and their habitat has not been quantified. These impacts have gained attention in recent years [7,9] because of the continuing prevalence of "trespass grows," illicit marijuana cultivation on public land. In comparison, the extent of cultivation and any associated environmental impacts on private lands are poorly understood, primarily because of limited access. In addition, state and local agencies lack the resources to address environmental impacts related to cultivation on private lands. In contrast with many MCSs on public lands, MCSs on private lands appear to be legal under state law, pursuant to Proposition 215. Regardless of the legal status of these MCSs, the water use associated with them has become an increasing concern for resource agencies [13].

California's Mediterranean climate provides negligible precipitation during the May—September growing season. In Northern California, 90–95% of precipitation falls between October and April [14]. Marijuana is a high water-use plant [2,15], consuming up to 22.7 liters of water per day. In comparison, the widely cultivated wine grape, also grown throughout much of Northwestern California, uses approximately 12.64 liters of water per day [16]. Given the lack of precipitation during the growing season, marijuana cultivation generally requires a substantial amount of irrigation water. Consequently, MCSs are often situated on land with reliable year-round surface water sources to provide for irrigation throughout the hot, dry summer growing season [7,8,12]. Diverting springs and headwater streams are some of the most common means for MCSs to acquire irrigation water, though the authors have also documented the use of groundwater wells and importing water by truck.

The impacts to aquatic ecosystems from large hydroelectric projects and other alterations of natural flow regimes have been well documented [17–20], but few studies have attempted to

quantify the impacts of low-volume surface water diversions on stream flows [21,22]. A study in the Russian River watershed in Sonoma County, CA, concluded that the demand of registered water diversions exceeded stream flows during certain periods of the year, though this study did not quantify unregistered diversions. In addition, this study indicates that these registered diversions have the potential to depress spring base flows and accelerate summer recession of flows [22]. We postulate that the widespread, increasing, and largely unregulated water demands for marijuana cultivation, in addition to existing domestic demands, are cumulatively considerable in many rural Northern California watersheds.

In northern California, unregulated marijuana cultivation often occurs in close proximity to habitat for sensitive aquatic species. Because of this proximity and the water demands associated with cultivation, we chose to focus on the cumulative impacts of low-volume surface water diversions associated with marijuana cultivation. We evaluate these water demands at a watershed scale to determine whether they could have substantial effects on streamflow during the summer low-flow period. In addition, we discuss which sensitive aquatic species are most likely to be impacted by stream diversions and describe the nature of these impacts.

Methods

Methods are presented for the following components of the study: study area selection, data collection, water use estimates, and hydrologic analysis. For the purposes of this study, a MCS is defined as any area where marijuana is grown, either outdoors or inside a greenhouse, based on our aerial image interpretation. Because marijuana cultivation is federally illegal, its scope and magnitude are difficult to measure precisely [2,4,23]. However, the authors have accompanied law enforcement on search warrants and site inspections to evaluate more than 40 MCSs in the Eel River watershed and other watersheds in northwestern California. During these site inspections the number, size, and arrangement of marijuana plants were recorded, as were the water sources, conveyance and storage methods. These on-the-ground verification data were used as the basis for identifying characteristics of MCSs from aerial images.

Study Areas

Four study watersheds were selected—Upper Redwood Creek, Salmon Creek, and Redwood Creek South, located in Humboldt County; and Outlet Creek, located in Mendocino County (Figs. 1–4). Study watersheds were selected using the following criteria: (1) they are dominated by privately owned forestlands and marijuana cultivation is widespread within their boundaries as verified by low altitude survey flights and aerial imagery. (2) The primary watercourse, or downstream receiving body, has documented populations of sensitive aquatic species, such as coho salmon (*Oncorhynchus kisutch*). (3) Watersheds are of sufficient size so as to allow realistic population-scale and regional ecological relevance, but are not so large that conducting an analysis would be infeasible given limited staffing resources. (4) Streams in the watershed had either a flow gage, or nearby streams were gaged, which would allow proxy modeling of the low-flow period in the study watershed.

Habitat

The study watersheds are dominated by a matrix of open to closed-canopy mixed evergreen and mixed conifer forests with occasional grassland openings. Dominant forest stands include Tanoak (*Notholithocarpus densiflorus*) and Douglas-fir (*Pseudotsuga menziesii*) Forest Alliances ("Alliance" is a vegetation classification unit that identifies one or more diagnostic species in the upper canopy layer that are indicative of habitat conditions) [24]. These forests are dominated by Douglas—fir, tanoak, madrone (*Arbutus menziesii*), big leaf maple (*Acer*

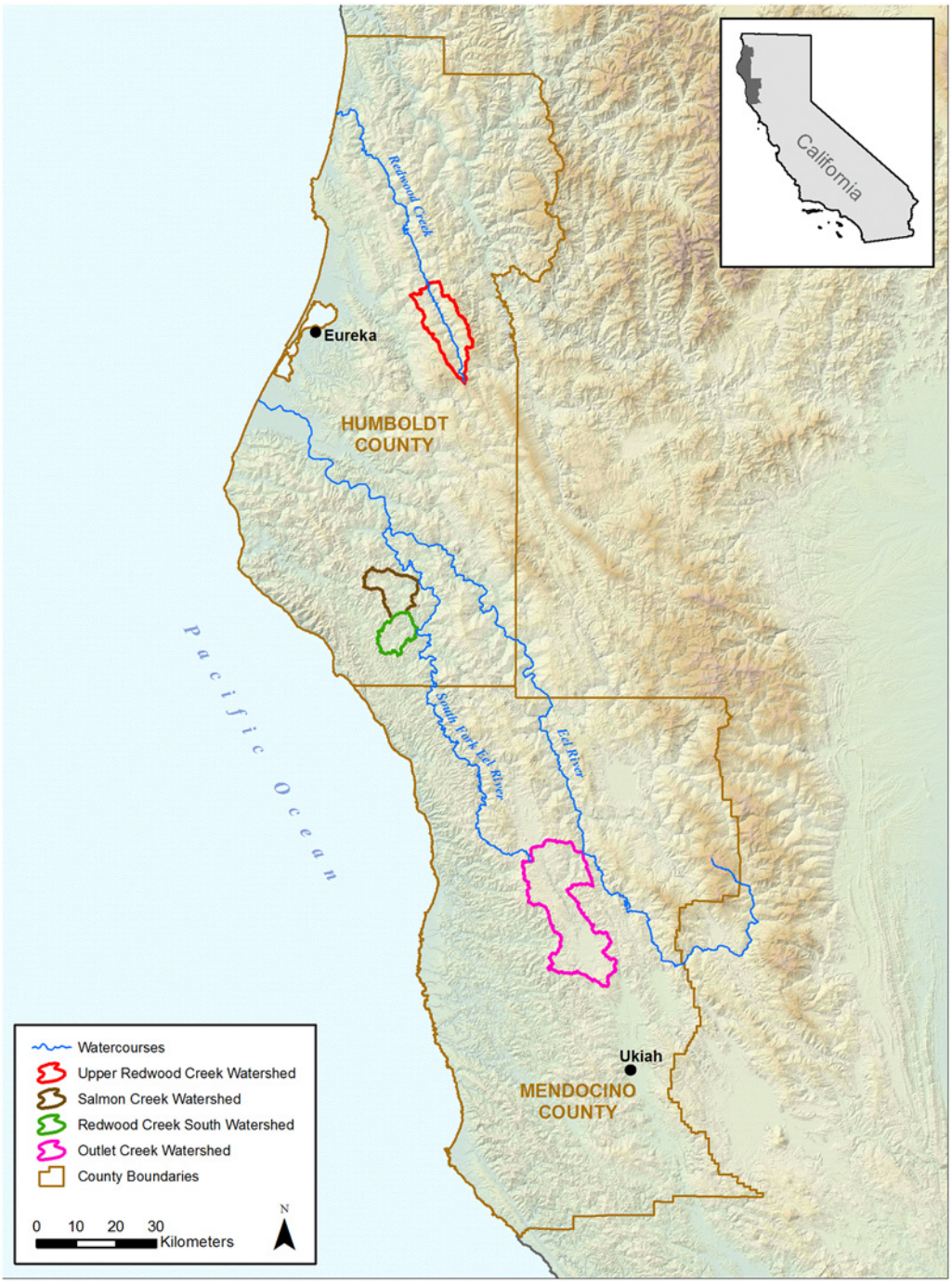

Fig 1. Study Watersheds and Major Watercourses.

doi:10.1371/journal.pone.0120016.g001

macrophyllum), and various oak species (*Quercus* spp.). The Redwood (*Sequoia sempervirens*) Forest Alliance, as described by Sawyer et al. [24] is dominant in areas of Upper Redwood Creek and in lower Salmon Creek and Redwood Creek South and includes many of the same dominant or subdominant species in the Tanoak and Douglas-fir Forest Alliances. These watersheds, a product of recent and on-going seismic uplift, are characterized as steep

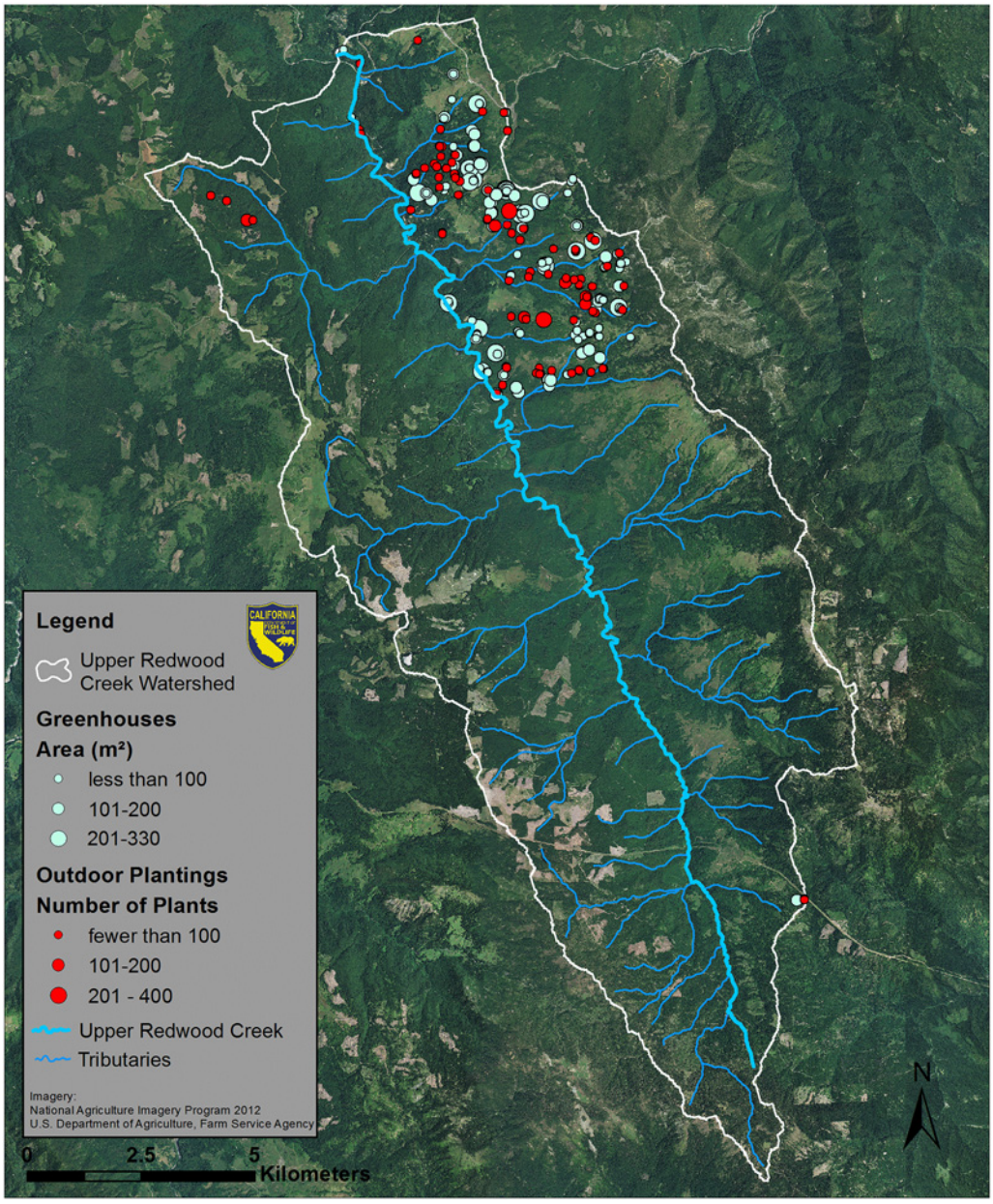

Fig 2. Upper Redwood Creek Watershed. Outdoor marijuana plantings are marked in red and greenhouses are marked in light green.

doi:10.1371/journal.pone.0120016.g002

mountainous terrain dissected by an extensive dendritic stream pattern, with the exception of Upper Redwood Creek, which has a linear trellised stream pattern [25].

Data Collection and Mapping Overview

Study watershed boundaries were modified from the Calwater 2.2.1 watershed map [26] using United States Geological Survey (USGS) 7.5 minute Digital Raster Graphic images to correct for hydrological inconsistencies. These watershed boundaries and a reference grid with one square kilometer (km^2) cells were used in Google Earth mapping program and ArcGIS (version 10.x, ESRI, Redlands, CA). Using Google Earth's high-resolution images of northern California

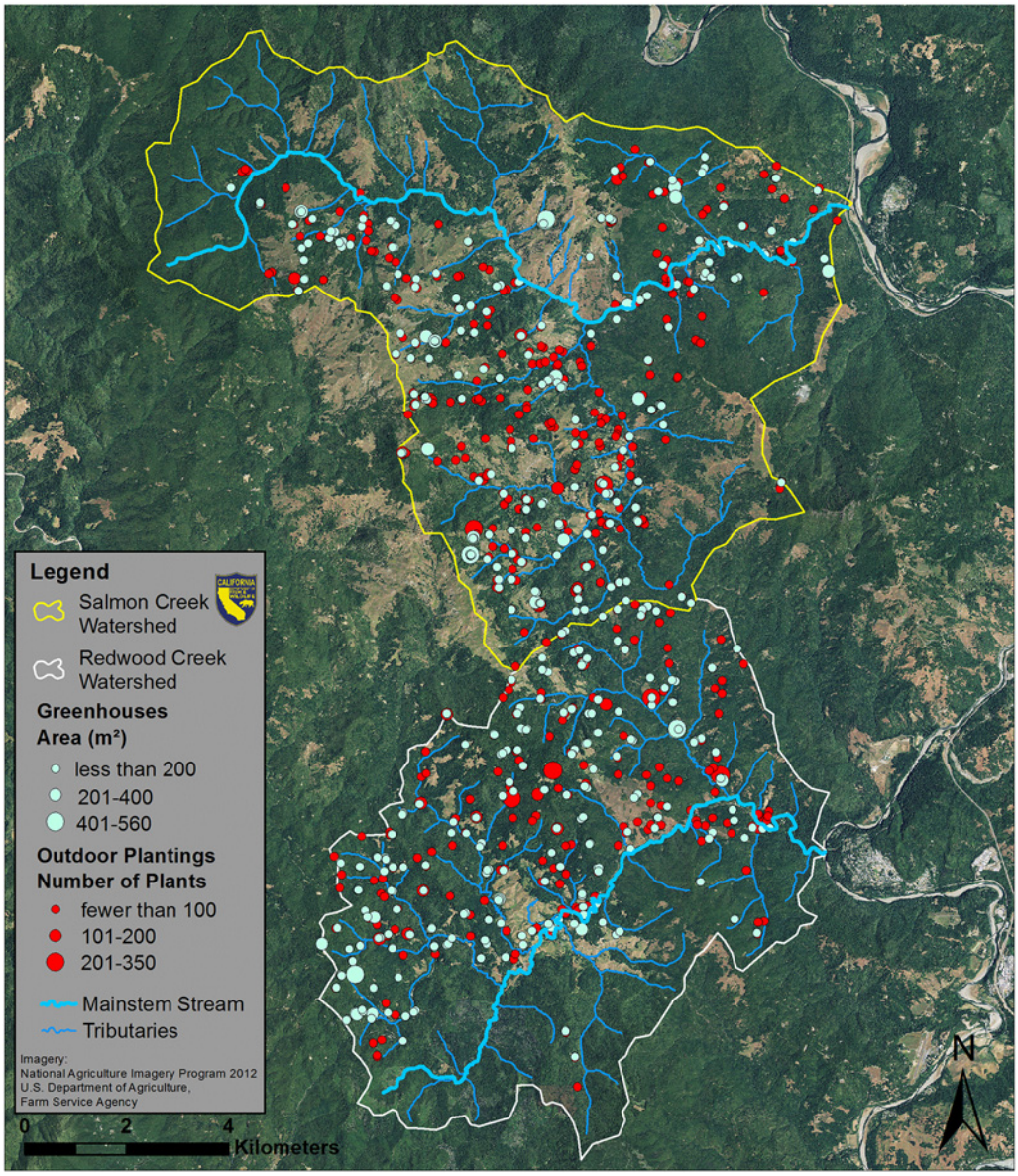

Fig 3. Salmon Creek and Redwood Creek South Watersheds. Outdoor marijuana plantings are marked in red and greenhouses are marked in light green.

doi:10.1371/journal.pone.0120016.g003

(image dates: 8/17/11, 7/9/12, and 8/23/12) as a reference, features of interest such as greenhouses and marijuana plants were mapped as points in ArcGIS. We identified greenhouses by color, transparency, elongated shape, and/or visible plastic or metal framework. Although we could not confirm the contents of greenhouses, the greenhouses we measured were generally associated with recent land clearing and other development associated with the cultivation of marijuana, as observed in our site inspections with law enforcement. Greenhouses clearly associated with only non-marijuana crop types, such as those in established farms with row crops, were excluded from our analysis. We identified outdoor marijuana plants by their shape, color, size and placement in rows or other regularly spaced configurations. We measured greenhouse lengths and widths using the Google Earth "Ruler" tool to obtain area, and counted and recorded the number of outdoor marijuana plants visible within each MCS. We also examined

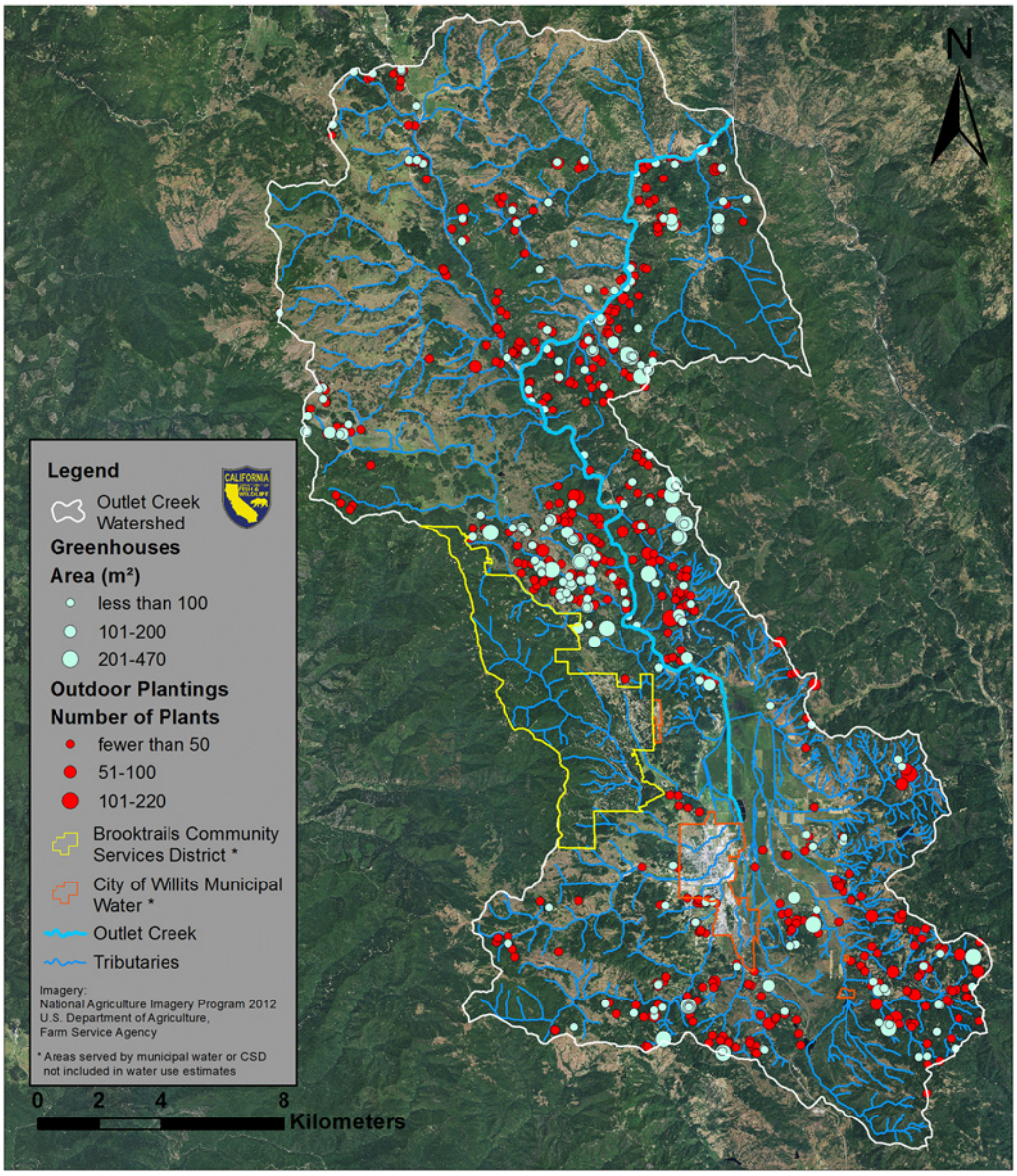

Fig 4. Outlet Creek Watershed. Outdoor marijuana plantings are marked in red and greenhouses are marked in light green.

doi:10.1371/journal.pone.0120016.g004

imagery from previous years using the Google Earth "Historical Imagery" tool to confirm that outdoor plants were not perennial crops, such as orchards.

Plant Abundance and Water Use Estimates

For each watershed, we totaled the number of marijuana plants that were grown outdoors and combined this value with an estimated number of marijuana plants in greenhouses to get a total number of plants per watershed. To develop a basis for estimating the number of marijuana plants in greenhouses, we quantified the spatial arrangement and area of marijuana plants in 32 greenhouses at eight different locations in four watersheds in Humboldt County while accompanying law enforcement in 2013. We calculated 1.115 square meters (m^2) per plant as an average spacing of marijuana plants contained within greenhouses. For the purposes of this

study, we assume that the average greenhouse area to plant ratio observed by the authors on law enforcement visits was representative of the average spacing used at MCSs in the study watersheds.

Our water demand estimates were based on calculations from the 2010 Humboldt County Outdoor Medical Cannabis Ordinance draft [27], which states that marijuana plants use an average of 22.7 liters per plant per day during the growing season, which typically extends from June-October (150 days). Water use data for marijuana cultivation are virtually nonexistent in the published literature, and both published and unpublished sources for this information vary greatly, from as low as 3.8 liters up to 56.8 liters per plant per day [7,28]. The 22.7 liter figure falls near the middle of this range, and was based on the soaker hose and emitter line watering methods used almost exclusively by the MCSs we have observed. Because these water demand estimates were used to evaluate impacts of surface water diversion from streams, we also excluded plants and greenhouses in areas served by municipal water districts (Outlet Creek, Fig. 4).

Hydrologic Analyses: Estimating Impacts on Summer Low Flows

The annual seven-day low flow, a metric often used to define the low flow of a stream, is defined as the lowest value of mean discharge computed over any seven consecutive days within a water year. This value varies from year to year. Annual seven-day low flow values for the ungaged watersheds in this study were estimated by correlating to nearby USGS gaged streams. Annual seven-day low flow values for Elder Creek (Fig. 5), a gage used for this correlation, demonstrate the year-to-year variability in the study watersheds. Elder Creek is considered to be the least disturbed of the gaged watersheds, and is also the smallest, with a contributing area of 16.8 square kilometers. The annual seven-day low flow estimates were made by scaling the gaged data by the ratio of average flow of the ungaged and gaged stream, a method that provides better estimates than scaling by watershed area [29]. Regression equations based on average annual precipitation and evapotranspiration were used to estimate average annual flow, providing a more unique flow characterization than using watershed area alone. These methods were developed by Rantz [30]. The gaged data were either from within the watershed of the study area or from a nearby watershed. Correlation with daily average flow data from a gaged

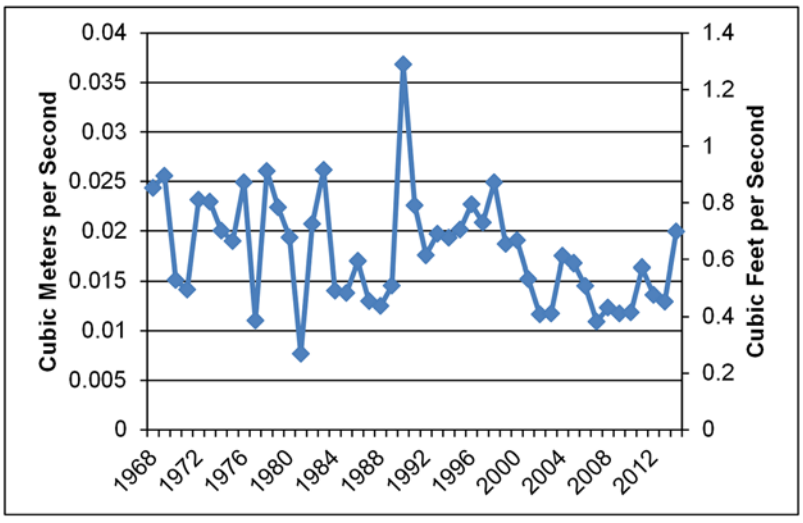

Fig 5. Elder Creek annual seven-day low flow. Values are shown for the period of record (water years 1968–2014).

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stream makes sense when the ungaged watershed is considered to be hydrologically similar to the gaged watershed, i.e. similar geology, vegetation, watershed size and orientation, and atmospheric conditions (precipitation, cloud cover, temperature). The accuracy of gaged data at low flows can be problematic because gaging very low flows is difficult and limited depending on the location of the gage and the precision in low-flow conditions, but the method can still provide a rough estimate of low flow by taking into account the range of uncertainty. Data were used from the closest most relevant gaged watershed for correlation to the ungaged sites.

Data for the gaged stations are shown in Table 1. This table includes the estimated average annual flow calculated from both the gaged data and also by use of the regression equations for comparison. The annual seven-day low flow for the period of record of each of the gaged stations is shown in Table 2. This table also shows the minimum, average, and maximum seven-day low flow values over the period of record as a way to represent the variability of the low flow from year to year. To estimate the annual seven-day low flow for the ungaged streams, the average annual seven-day low flow of the gaged stream was multiplied by the ratio of the annual average streamflow of the ungaged stream and the annual average streamflow of the gaged stream. A range of values, including the lowest and highest estimate for each location were calculated to represent the annual variability.

The mean annual streamflow of each ungaged stream was estimated using a regression equation, based on estimates of runoff and basin area developed by Rantz [30] (Equation 1). The mean annual runoff was estimated from a second regression equation (Equation 2) based on the relationship between mean annual precipitation and annual potential evapotranspiration for the California northern coastal area [30]. Mean annual precipitation values are from the USGS StreamStat web site (http://water.usgs.gov/osw/streamstats/california.html), which uses the PRISM average area weighted estimates based on data from 1971–2000. The estimates of mean annual evapotranspiration were taken from a chart produced by Kohler [31].

$$Q_{Avg} = 0.07362 = \left(\frac{m^3}{sec} \times yr \times cm \times km^2\right) \times R \times A \qquad \text{eq.(1)}$$

Table 1. USGS stream gages in or near study watersheds.

Watershed	Gage	Period of Record	Area (km^2)	MAP[a] (cm/yr)	PET[b] (cm/yr)	Mean Annual Runoff (cm/yr)	Q[c]avg (CMS[d]), predicted	Qavg (CMS), gaged	% difference
South Fork Eel River	USGS 11476500	10/1/1930–9/30/2012	1390.8	192.8	101.6	129.0	57.8	52.0	-11.1
Bull Creek	USGS 11476600	10/1/1967–9/30/2012	72.5	166.4	101.6	102.6	2.4	3.3	27.1
Elder Creek	USGS 11475560	10/1/1967–9/30/2012	16.8	215.9	101.6	152.1	0.8	0.7	-14.9
Outlet Creek	USGS 11472200	10/1/1956–9/30/1994	417.0	152.9	101.6	89.2	12.1	11.1	-8.8
Upper Redwood Creek	USGS 11481500	10/01/1953–10/1/2013	175.3	231.1	86.4	173.5	9.6	8.5	-12.6
Redwood Creek South	Ungaged	N/A	64.7	157.2	101.6	93.5	0.46	N/A	N/A
Salmon Creek	Ungaged	N/A	95.1	151.4	101.6	87.6	0.48	N/A	N/A

[a]mean annual precipitation

[b]potential evapotranspiration

[c]flow

[d]cubic meters per second

doi:10.1371/journal.pone.0120016.t001

Table 2. Annual seven-day low flow range for period of record.

Gage	Seven-day low flow for period of record in cubic meters per second		
	Minimum	Average	Maximum
SF Eel Miranda	0.3519	0.8829	1.796
Bull	0.0059	0.0310	0.0853
Elder	0.0076	0.0180	0.0368
Outlet Creek	0.0000	0.0162	0.0498
Upper Redwood Creek	0.0265	0.1064	0.2601
Redwood Creek South (based on Elder Creek)	0.004	0.010	0.021
Salmon Creek (based on Elder Creek)	0.005	0.011	0.022

doi:10.1371/journal.pone.0120016.t002

With

$$R = MAP - 0.4(PET) - 9.1$$

Where

$$Q_{Avg} = mean\ annual\ discharge\left(\frac{m^3}{sec}\right)$$

$$R = mean\ annual\ runoff\left(\frac{cm}{yr}\right)$$

$$A = drainage\ area(km^2)$$

$$MAP = mean\ annual\ precipitation\left(\frac{cm}{yr}\right)$$

$$PET = potential\ evapotranspiration\left(\frac{cm}{yr}\right)$$

Estimates of average annual flow made by using these equations range from-15% to +27% below and above the calculated value using the gaged daily average data (Table 1). The Bull Creek gage estimate produced the largest deviation of 27% and may be considered an outlier because of the known disturbances in the watershed due to historic logging practices, and USGS reported "poor" low flow data.

The mean annual flow for each ungaged watershed was calculated using the Rantz method described above. The mean annual precipitation and runoff values are shown in Table 1 with the predicted mean annual flow for the ungaged streams. The annual seven-day low flows for Upper Redwood Creek and Outlet Creek were calculated using data from their respective stream gages. For Redwood Creek South and Salmon Creek, both watersheds with no main-stem gage, the annual seven-day low flow was calculated in the same way by using the data from nearby gaged streams within the South Fork Eel watershed (Bull Creek, Elder Creek, and South Fork Eel near Miranda gage). Fig. 6 shows three different estimates of the duration curves of the annual seven-day low flow for the Redwood Creek South ungaged site based on the three different nearby gages. The variations between these estimated duration curves (Fig. 6) illustrate the relative variability of annual seven-day low flow. Reasons for this

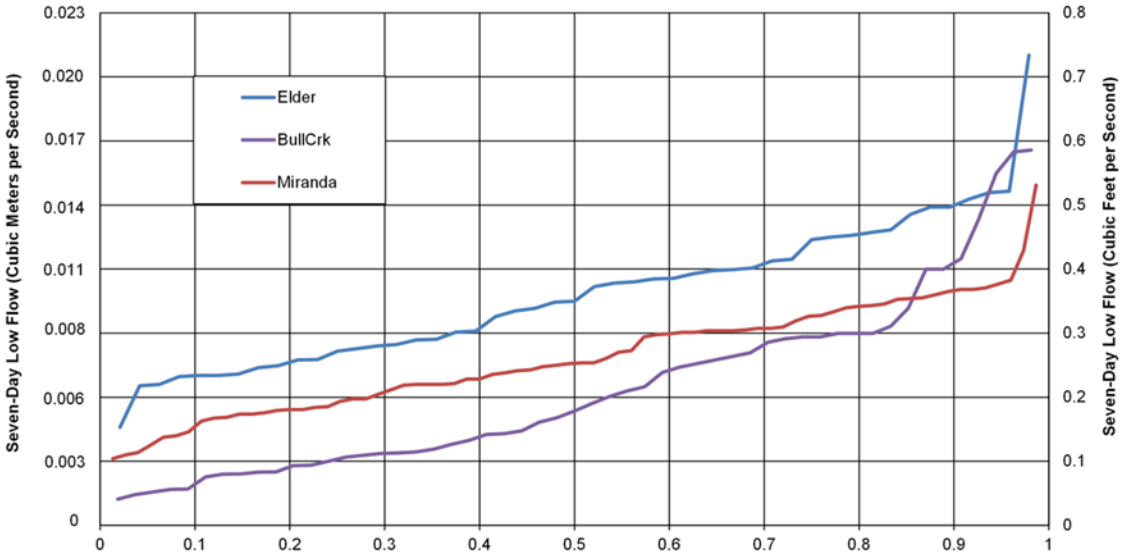

Fig 6. Duration curve of estimates of annual seven-day low flow for Redwood Creek South based on USGS data from nearby streams (Elder Creek, South Fork Eel at Miranda, and Bull Creek).

doi:10.1371/journal.pone.0120016.g006

variability may include the difference in hydrologic response of the gaged watersheds from the ungaged watersheds, differences in withdrawals or low flow measurement error, differences in the atmospheric patterns over the watershed, or differences in watershed characteristics (watershed size, orientation, land use, slope etc.). The gaged watersheds differed from the study watersheds in several ways, such as size (Miranda gage), disturbance (Bull Creek gage), and distance and orientation from the study watersheds (Elder Creek gage). Despite the differences, the Elder Creek gage most likely represents the best data set for correlation to the ungaged watersheds based on its similar size and relative unimpairment. The estimated values represent the upper limit of low flows for the ungaged streams, thus are conservative values and may be an overestimate.

Results

MCSs were widespread in all four study watersheds. In general, MCSs were clustered and were not evenly distributed throughout the study watersheds (Figs. 2–4). Estimated plant totals ranged from approximately 23,000 plants to approximately 32,000 plants per watershed (Table 3). Using the plant count estimates multiplied by our per plant daily water use estimate of 22.7 liters [27] we determined that water demands for marijuana cultivation range from 523,144 liters per day (LPD) to 724,016 LPD (Table 3). We also calculated the daily water use for each parcel that contained at least one marijuana cultivation site (S1 Table). Histograms showing the frequency distribution of daily water use per parcel are displayed for each watershed in Fig. 7. The majority of parcels in this study use an estimated 900 to 5,000 LPD for marijuana cultivation. These water use estimates are only based on irrigation needs for the marijuana plants counted or the greenhouses measured on that parcel, and do not account for indoor domestic water use, which in Northern California averages about 650 liters per day [32]. Thus, our water use demand estimates for marijuana cultivation are occurring in addition to domestic household uses that may occur and are also likely satisfied by surface water diversions.

Outdoor plants and greenhouses were identified from aerial images of Humboldt and Mendocino Counties. Greenhouse areas were estimated using the Google Earth measuring tool and

Table 3. Marijuana mapping summary of four watersheds.

Watershed	Outdoor Plants	Green-houses (counted)	Total area, m^2 (Green-houses)	Estimated Plants in Green-houses	Estimated Total Plants in Watershed	Estimated Water Use per Day (Liters)
Upper Redwood Creek	4,434	220	20749.4	18,612	23,046	523,144
Salmon Creek	11,697	302	20557.5	18,440	30,137	684,110
Redwood Creek South	10,475	324	18703.9	16,777	27,252	618,620
Outlet Creek	15,165	266	18651.1	16,730	31,895	724,016

doi:10.1371/journal.pone.0120016.t003

an average area of 1.11484 m^2 (converted from 12 ft^2) per plant was used to estimate total number of plants in greenhouses.

Minimum and maximum annual seven-day low flow values in these watersheds (Table 2) ranged from 0.0–0.05 cubic meters per second (CMS) in Outlet Creek to. 03 -. 26 CMS in

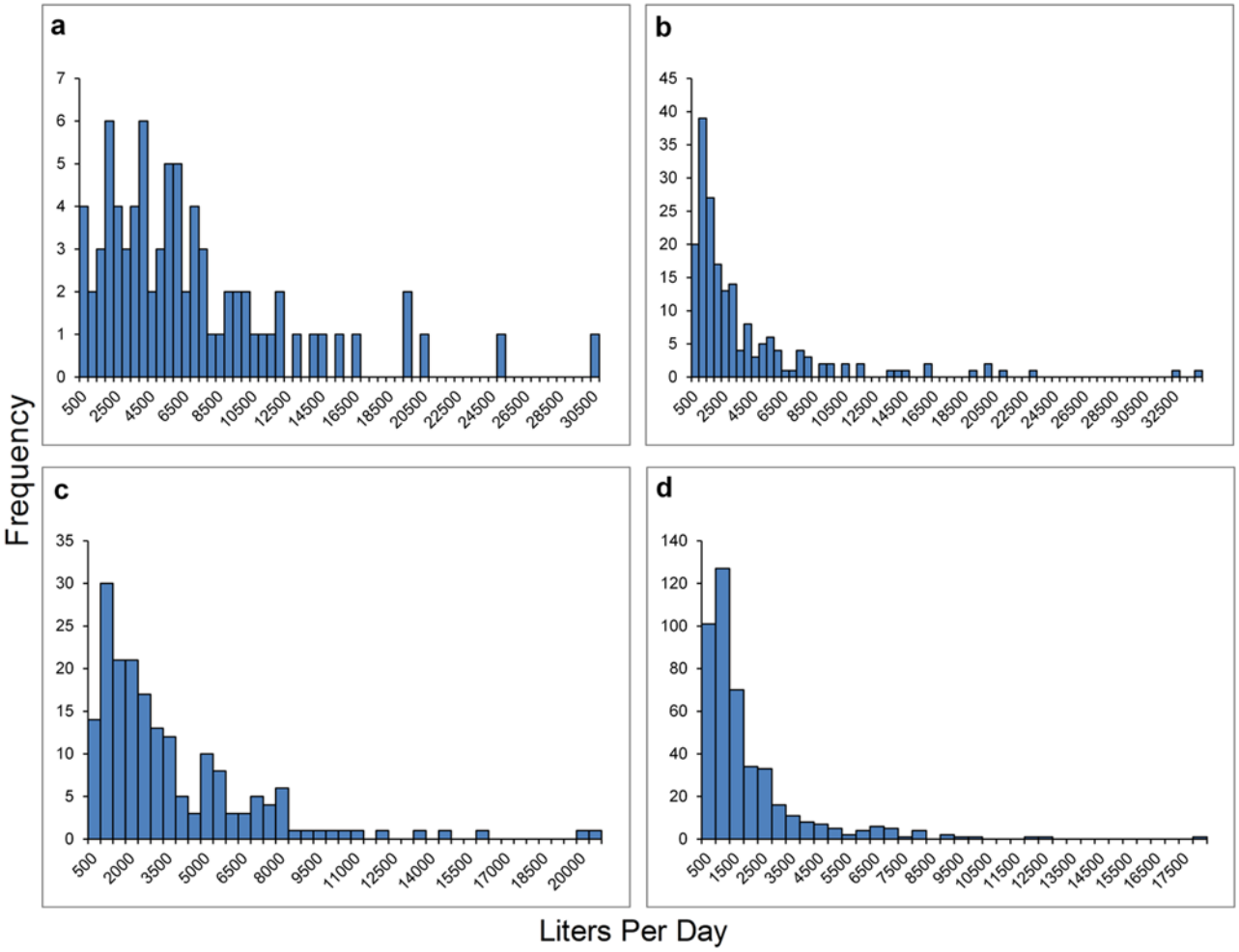

Fig 7. Frequency distribution of the water demand in liters per day (LPD) required per parcel for marijuana cultivation for each study watershed. (a) Upper Redwood Creek watershed, 79 parcels with marijuana cultivation, average water use 6622 LPD, (b) Salmon Creek watershed, 189 parcels with marijuana cultivation, average water use 3620 LPD, (c) Redwood Creek South watershed, 187 parcels with marijuana cultivation, average water use 3308 LPD, (d) Outlet Creek watershed, 441 parcels with marijuana cultivation, average 1642 LPD. See also S1 Table.

doi:10.1371/journal.pone.0120016.g007

Upper Redwood Creek. By comparing daily water demands to minimum and maximum annual seven-day low flow values, we arrived at a range of values that represent water demand for marijuana cultivation as a percentage of stream flow in each watershed (Table 4, S2 Table). In Upper Redwood Creek, which had the greatest summer flows (Table 2), we estimate water demand for marijuana cultivation is the equivalent of 2–23% of the annual seven-day low flow, depending on the water year. In Redwood Creek South, our data indicate that estimated water demand for marijuana cultivation is 34–165% of the annual seven-day low flow, and in Salmon Creek, estimated water demand for marijuana is 36–173% of the annual seven-day low flow. In Outlet Creek, estimated demand was 17% of the maximum annual seven-day low flow. However, the percent of the annual seven-day low flow minimum could not be calculated because this minimum stream flow was undetectable at the gage (flow <0.00 CMS) in nine of 38 years during the period of record (1957–1994). Due to this minimum annual seven-day low flow of almost zero, marijuana water demand is greater than 100% of the minimum annual seven-day low flow, but we cannot determine by how much.

We also compared the per-watershed daily water demands to the seven-day low flow values for each year of data available in order to better understand the magnitude and frequency of these water demands (Fig. 8, S2 Table). Although substantial demand for water for marijuana cultivation is a more recent and growing phenomenon, by comparing the water use estimates from our remote sensing exercise to historical stream flow data we can better understand how this demand as a percentage of stream flow may vary over the years. Our results indicate that if the same level of water demand for marijuana cultivation had been present for the period of record of the gages, this demand would have accounted for over 50% of streamflow during the annual seven-day low flow period in the majority of years in the Redwood Creek South and Salmon Creek watersheds (based on Elder Creek gage data that spans from water year 1968–2014). In Outlet Creek, the annual seven-day low flow data varied greatly over the period of record (water year 1957–1994) and was too low to measure in nine of the 38 years. The seven-day low flow value was therefore recorded as zero, which means that the water demand was greater than 100% of streamflow, but we could not calculate the water demand as a percentage of stream flow in those years. In Upper Redwood Creek, water demand was much less pronounced in comparison to stream flow, with water demand never accounting for more than 23% of the annual seven-day low flow, and accounting for 10% or greater of the annual seven-day low flow in only 30% of years during the period of record (water year 1954–2014 with a gap between 1959–1972). To summarize, we estimate that in three of the four watersheds evaluated, water demands for marijuana cultivation exceed streamflow during low-flow periods.

Table 4. Estimated water demand for marijuana cultivation expressed as a percentage of seven-day low flow in four study watersheds.

Watershed	Area (km^2)	Plants per km^2	Demand as percent of seven-day low flow	
			Percent of low flow maximum	Percent of low flow minimum
Upper Redwood Creek	175.3	131.6	2%	23%
Salmon Creek	95.1	316.9	36%	173%
Redwood Creek South	64.7	421.2	34%	165%
Outlet Creek	419.1	76.1	17%	>100%*

* The seven-day low flow minimum was measured as 0.0 CMS at the gage.

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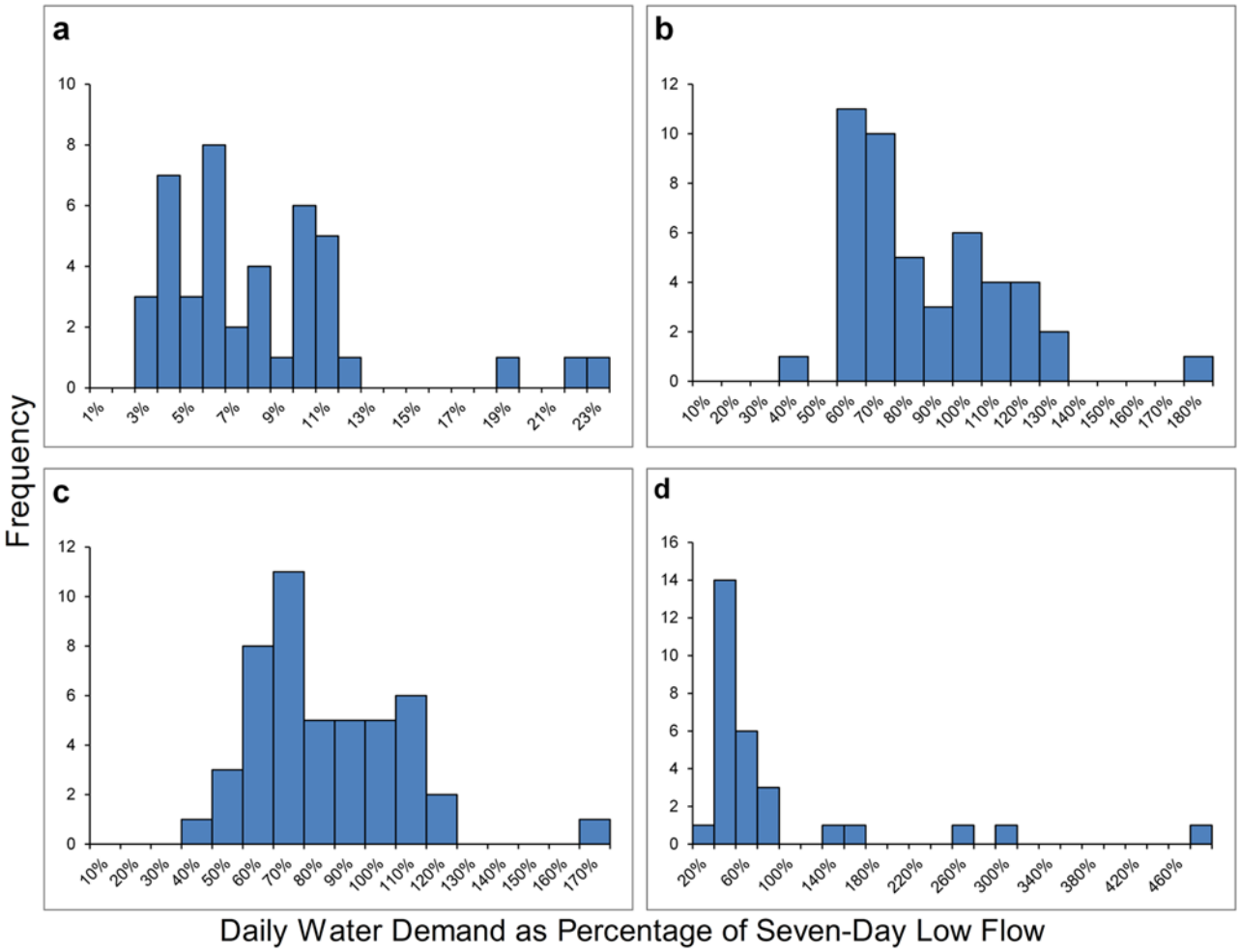

Fig 8. Frequency distribution of the water demand for marijuana cultivation as a percentage of seven-day low flow by year in each study watershed. Water demand data are from a remote sensing exercise using aerial imagery from 2011–2012 and are compared with each year's annual seven-day low flow value for the period of record in each study watershed: (a) Upper Redwood Creek watershed (USGS gage near Blue Lake, CA, coverage from water year (WY) 1954–1958 and 1973–2014), (b) Salmon Creek watershed (data modeled using USGS gage on Elder Creek, CA, coverage from WY 1968–2014), (c) Redwood Creek South (data modeled using USGS gage on Elder Creek, CA, coverage from WY 1968–2014), and (d) Outlet Creek (USGS gage near Longvale, CA, coverage from WY 1957–1994). Data from WYs 1977, 1981, 1987–1989, and 1991–1994 are excluded from Outlet Creek watershed due to seven-day low flow values of zero at the gage. Water demand as a percentage of seven-day low flow would be >100% in these years, but we cannot determine by how much.

doi:10.1371/journal.pone.0120016.g008

Discussion

Aerial Imagery Limitations and Water Demand Assumptions

Due to a number of factors, it is likely that the plant counts resulting from aerial imagery interpretation (Table 3) are minimum values. The detection of marijuana plants using aerial imagery was found most effective for larger cultivation plots in forest clearings greater than 10 m^2 because forest canopy cover and shadows can obscure individual plants or small plots, preventing detection. Some cultivators plant marijuana on a wide spacing in small forest canopy openings in order to avoid aerial detection [7,8]. The authors have also observed a variety of cultivation practices such as the use of large indoor cultivation facilities that could not be detected via aerial imagery. Moreover, a review of Google Earth historical aerial images after field inspections revealed that all MCSs visited in 2013 were either new or had expanded

substantially since the previous year. Therefore, it is likely our results underestimate the total number of plants currently grown in these study watersheds and consequently underestimate the associated water demands.

Marijuana has been described as a high water-use plant [2,15] that thrives in nutrient rich moist soil [33]. Marijuana's area of greatest naturalization in North America is in alluvial bottomlands of the Mississippi and Missouri River valleys where there is typically ample rain during the summer growing season [23,33]. Female inflorescences and intercalated bracts are the harvested portion of the marijuana plant. According to Cervantes [15], marijuana uses high levels of water for floral formation and withholding water stunts floral formation. Cervantes recommends marijuana plants be liberally watered and "allow for up to 10 percent runoff during each watering."

There is uncertainty as to actual average water use of marijuana plants because there are few reliable published reports on marijuana water use requirements. As with the cultivation of any crop, variation in average daily water use would be expected based upon many variables, including the elevation, slope, and aspect of the cultivation site; microclimate and weather; size, age, and variety of the plant; native soil type and the amount and type of soil amendments used and their drainage and water retention characteristics; whether plants are grown outdoors, in greenhouses, or directly in the ground or in containers and the size of the container; and finally, the irrigation system used and how efficiently the system is used and maintained [34–36]. However, our water demand estimate of 22.7 L/day/plant based on the limited industry data available [27] comports with the U.S. Department of Justice 2007 Domestic Cannabis Cultivation Assessment [2], which indicates marijuana plants require up to 18.9 L/day/plant.

In many rural watersheds in Northern California, the primary source for domestic and agricultural water is from small surface water diversions [37]. These diversions must be registered with the State Water Resources Control Board (SWRCB), the agency responsible for administering water rights in California. SWRCB registrations are also subject to conditions set by the California Department of Fish and Wildlife in order to protect fish, wildlife, and their habitats. However, when querying the SWRCB's public database, we found low numbers of registered, active water diversions on file relative to the number of MCSs we counted in the study watersheds. The total number of registered, active diversions on file with the SWRCB accounted less than half of the number of parcels with MCSs that were visible from aerial imagery (Fig. 9). In some watersheds, the number was as low as 6%. Since we do not know if the registered diversions on file with the SWRCB belong to parcels with MCSs, it is uncertain if the registered diversions in a particular watershed are connected with any of the MCSs we counted.

Our calculations of water demand as a percentage of stream flow assume that all potential water users are diverting surface water or hydrologically-connected subsurface flow. Historical water use practices and our field inspections with law enforcement support this assumption, although there are few hard data available as there are relatively few active registered water diversions on file with the Division of Water Rights when compared to the potential number of water users in the watersheds (Fig. 9).

Implicit in our calculations is the assumption that all water users are pumping water at the same rate throughout the day, as well as throughout the growing season. In reality, we expect water demand to gradually increase throughout the season as plants mature. This increased water demand would coincide with the natural hydrograph recession through the summer months, creating an even more pronounced impact during the summer low-flow period. In a similar study that monitored flow in relation to surface water abstraction for vineyard heat protection, flows receded abnormally during periods of high maximum daily temperature [21]. These results indicate that water users can have measureable effects on instantaneous flow in periods of high water demand. Our results suggest that similar impacts could occur during the summer low flow period in the study watersheds.

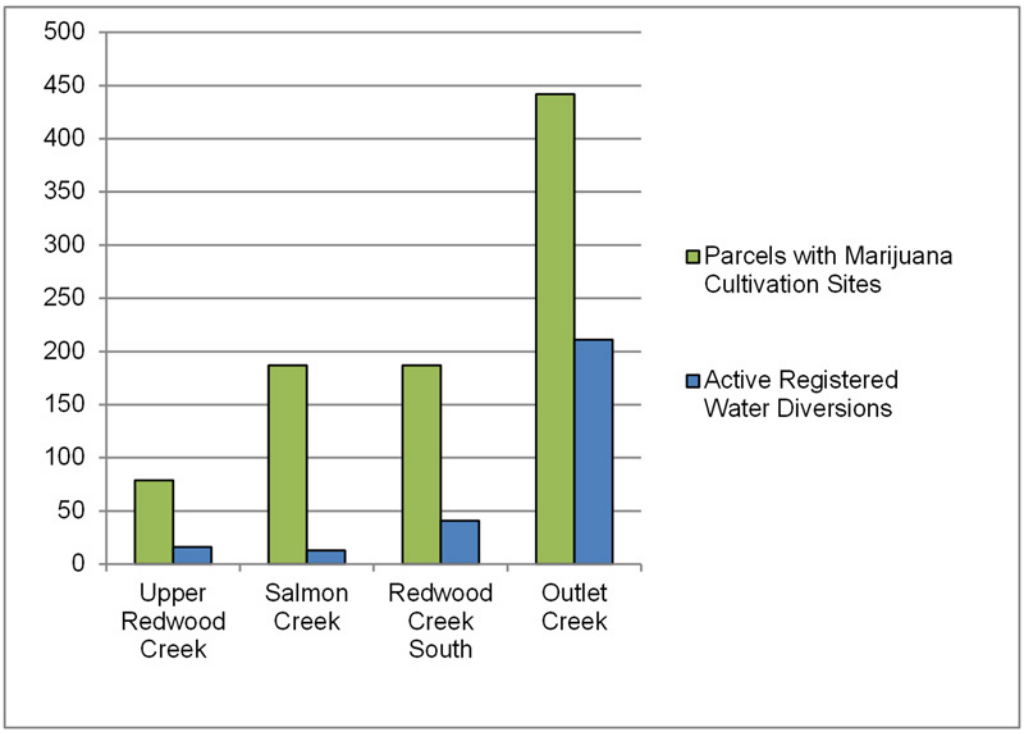

Fig 9. Active water rights in the study watersheds. Parcels with active registered water diversions (on file with California's Division of Water Rights) compared to parcels with marijuana cultivation sites (MCSs) in the four study watersheds.

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Additionally, our analysis assumes the water withdrawals will impact the entire watershed in an even, consistent way. In reality, we would expect water demand to be more concentrated at certain times of day and certain periods of the growing season, as described above. Furthermore, results of our spatial analysis indicate that MCSs are not evenly distributed on the landscape, thus impacts from water withdrawals are likely concentrated in certain areas within these watersheds. Because of these spatially and temporally clustered impacts, we may expect to see intensification of stream dewatering or temperature elevation in certain tributaries at certain times of year, which could have substantial impacts on sensitive aquatic species. Recent data indicate that peaks in high stream temperatures and annual low-flow events are increasing in synchrony in western North America [38], an effect that would be exacerbated by the surface water withdrawals we describe here. Further modeling and on-the-ground stream flow and temperature observations are needed to elucidate the potential extent of these impacts. The minimum streamflow estimates in Salmon Creek, Redwood Creek South, and Outlet Creek are so low that even a few standard-sized pumps operating at 38 liters per minute (LPM), which is a standard rate approved by the SWRCB for small diversions, could dewater the mainstem stream if more than four pumps ran simultaneously in any one area. It follows that impacts on smaller tributaries would be even more pronounced. In addition, on-site observations of MCS irrigation systems, though anecdotal, indicate many of these water conveyance, storage, and irrigation systems lose a substantial amount of water through leaks and inefficient design. This would significantly increase the amount of surface water diverted from streams beyond what would actually be needed to yield a crop. More study is needed to fully understand the impacts of MCS water demand on instantaneous flow in these watersheds.

Given that marijuana cultivation water demand could outstrip supply during the low flow period, and based on our MCS inspections and surface water diversion and irrigation system observations, we surmise that if a MCS has a perennial water supply, that supply would be used exclusively. However, for MCSs with on-site surface water sources that naturally run dry in summer, or are depleted though diversion, it is likely that direct surface water diversion is used until the source is exhausted, then water stored earlier in the year or imported by truck supplants the depleted surface water. It is difficult to determine to what degree imported water and wet season water storage is occurring. However, our on-site MCS inspections support the assumption that the vast majority of irrigation water used for marijuana cultivation in the study watersheds is obtained from on-site surface water sources and water storage and importation is ancillary to direct surface water diversions.

Comparison of Water Demands to Summer Low Flows

Our results suggest that water demand for marijuana cultivation in three of the study watersheds could exceed what is naturally supplied by surface water alone. However, in Upper Redwood Creek, the data suggest that marijuana cultivation could have a smaller impact on streamflow, with demand taking up approximately 2% to 23% of flow (Table 4). This projected demand of flow contrasts with the 34% to >100% flow demand range in the other watersheds, most likely because Upper Redwood Creek has greater mean annual precipitation, less evapotranspiration, and generally higher stream flow than the other watersheds (Tables 1–2). Furthermore, approximately half of the Upper Redwood Creek watershed is comprised of either large timber company holdings or federal lands. As Fig. 2 illustrates, MCSs in Upper Redwood Creek are concentrated within a relatively small area of privately-owned land that has been subdivided. It stands to reason that if all the land within the Upper Redwood Creek watershed was subject to the subdivision and parcelization that has occurred in Redwood Creek South, Salmon Creek, or Outlet Creek, the potential impacts to stream flow would also be greater.

In Outlet Creek, our results indicate a large range of potential water demand as a percentage of streamflow, from 17% in a "wet" year to greater than 100% when the stream becomes intermittent, as it does during many summers. Our data indicate that impacts to streamflow will vary greatly depending on the individual watershed characteristics, whether the year is wetter or drier than average, and the land use practices taking place.

Environmental Impacts

The extent of potential environmental impacts in these watersheds is especially troubling given the region is a recognized biodiversity hotspot. According to Ricketts et al. [39], the study watersheds occur within the Northern California Coastal Forests Terrestrial Ecoregion. This ecoregion has a biological distinctiveness ranking of "globally outstanding" and a conservation status of "critical" [39]. For example, Redwood National Park, 20 km downstream of the Upper Redwood Creek sub-basin, has approximately 100 km^2 of old-growth redwood forest, which is one of the world's largest remaining old-growth redwood stands. The study watersheds also occur within the Pacific Mid-Coastal Freshwater Ecoregion defined by Abell et al. [40]. This ecoregion has a "Continentally Outstanding" biological distinctiveness ranking, a current conservation status ranking of "Endangered" and its ranking is "Critical" with regards to expected future threats [40]. Not surprisingly, numerous sensitive species, including state- and federally-listed taxa, occur in the study watersheds or directly downstream (Table 5).

Our results indicate that the high water demand from marijuana cultivation in these watersheds could significantly impact aquatic- and riparian-dependent species. In the Pacific Coast Ecoregion, 60% of amphibian species, 16% of reptiles, 34% of birds, and 12% of mammals can

Table 5. Sensitive aquatic species with ranges that overlap the four study watersheds: Upper Redwood Creek (URC), Redwood Creek South (RCS), Salmon Creek (SC), and Outlet Creek (OC).

Scientific Name	Common Name	Conservation Status in California	Study Watershed
Oncorhynchus kisutch	coho salmon	State and federally-threatened	URC, RCS, SC, OC
Oncorhynchus tshawytscha	Chinook salmon	federally-threatened	URC, RCS, SC, OC
Oncorhynchus clarki clarki	coastal cutthroat trout	SSC[1]	URC
Oncorhynchus mykiss	steelhead trout	federally-threatened	URC, RCS, SC, OC
Rana aurora	northern red-legged frog	SSC	URC, RCS, SC, OC
Rana boylii	foothill yellow-legged frog	SSC	URC, RCS, SC, OC
Rhyacotriton variegatus	southern torrent salamander	SSC	URC, RCS, SC, OC
Ascaphus truei	coastal tailed frog	SSC	URC, RCS, SC
Emys marmorata	western pond turtle	SSC	RCS, SC, OC
Margaritifera falcata	western pearlshell	S1S2[2]	URC

[1]The California Department of Fish and Wildlife designates certain vertebrate species as Species of Special Concern (SSC) because declining population levels, limited ranges, and/or continuing threats have made them vulnerable to extinction. Though not listed pursuant to the Federal Endangered Species Act or the California Endangered Species Act, the goal of designating taxa as SSC is to halt or reverse these species' decline by calling attention to their plight and addressing the issues of conservation concern early enough to secure their long-term viability.

[2] The California Natural Diversity Database (CNDDB) designates conservation status rank based on a one to five scale, one being "Critically Imperiled", five being "Secure". Uncertainty about a rank is expressed by a range of values, thus a status of S1S2 indicates that there is uncertainty about whether *Margaritifera falcata* ranks as state "Critically Imperiled" (S1) or state "Imperiled" (S2) [41].

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be classified as riparian obligates, demonstrating the wide range of taxa that potentially would be affected by diminished stream flows [42]. The impacts of streamflow diversions and diminished or eliminated summer streamflow would however disproportionately affect aquatic species, especially those which are already sensitive and declining.

Impacts to Fish

Northern California is home to some of the southernmost native populations of Pacific Coast salmon and trout (i.e., salmonids) and the study area is a stronghold and refugia for their diversity and survival. Every salmonid species in the study watersheds has some conservation status ranking (Table 5). California coho salmon, for example, have undergone at least a 70% decline in abundance since the 1960s, and are currently at 6 to 15% of their abundance during the 1940s [43]. Coho salmon populations in all four study watersheds are listed as threatened under both the California and the Federal Endangered Species Acts, and are designated as key populations to maintain or improve as part of the Recovery Strategy of California Coho Salmon [43].

Of California's 129 native inland fish species, seven (5%) are extinct in the state or globally; 33 (26%) are in immediate danger of becoming extinct (endangered), and 34 (26%) are in decline but not at immediate risk of extinction (vulnerable) [44]. According to Katz et al. [45], if present population trends continue, 25 (78%) of California's 32 native salmonid taxa will likely be extinct or extirpated within the next century.

The diminished flows presented by this study may be particularly damaging to salmonid fishes because they require clean, cold water and suitable flow regimes [44]. In fact, water diversions and altered or diminished in-stream flows due to land use practices have been identified as having a significant impact on coho salmon resulting in juvenile and adult mortality [43].

Additionally, all four study watersheds are already designated as impaired for elevated water temperature and sediment by the U.S. Environmental Protection Agency pursuant to the Clean

Water Act Section 303(d). Reduced flow volume has a strong positive correlation with increased water temperature [44]. Increased water temperatures reduce growth rates in salmonids, increase predation risk [46], and increase susceptibility to disease. Warmer water also holds less dissolved oxygen, which can reduce survival in juvenile salmonids [44]. Both water temperature and dissolved oxygen are critically important for salmonid survival and habitat quality [47–50].

Reduced stream flows can also threaten salmonids by diminishing other water quality parameters, decreasing habitat availability, stranding fish, delaying migration, increasing intra and interspecific competition, decreasing food supply, and increasing the likelihood of predation [43]. These impacts can have lethal and sub-lethal effects. Experimental evidence in the study region suggests summer dry-season changes in streamflow can lead to substantial changes in individual growth rates of salmonids [51]. Complete dewatering of stream reaches would result in stranding and outright mortality of salmonids, which has been observed by the authors at a number of MCSs just downstream of their water diversions.

Impacts to Amphibians

Water diversions and altered stream flows are also a significant threat to amphibians in the northwestern United States [52,53]. The southern torrent salamander (*Rhyacotriton variegatus*) and coastal tailed frog (*Ascaphus truei*) are particularly vulnerable to headwater stream diversions or dewatering, which could lead to mortality of these desiccation-intolerant species [54]. To maximize the compatibility of land use with amphibian conservation, Pilliod and Wind [53], recommend restoration of natural stream flows and use of alternative water sources in lieu of developing headwater springs and seeps.

Numerous studies have documented the extreme sensitivity of headwater stream-dwelling amphibians to changes in water temperature [55,56] as well as amounts of fine sediment and large woody debris [57,58]. Additionally, Kupferberg et al. and others [52,59] have demonstrated the impacts of altered flow regimes on river-dwelling amphibians. However, the threat of water diversion and hydromodification—or outright loss of flow—from headwaters streams has not been well-documented in the amphibian conservation literature. This is likely because illegal and unregulated headwater stream diversions did not exist at this scale until the recent expansion of marijuana cultivation in the region. In contrast, timber harvesting, which until recently was the primary land use in forested ecoregions in the western United States, does not typically divert headwater streams in the same manner as MCSs. Timber harvesting operations, at least in California, have state regulatory oversight that requires bypass flows to maintain habitat values for surface water diversions. Thus, the results of our study highlight an emerging threat to headwater amphibians not addressed in Lannoo [60], Wake and Vredenburg [61], or more recently in Clipp and Anderson [62]

Future Water Demands and Climate Change

Flow modification is one of the greatest threats to aquatic biodiversity [63]. As in many parts of the world, the freshwater needed to sustain aquatic biodiversity and ecosystem health in our study area is also subject to severe competition for multiple human needs. The threats to human water security and river biodiversity are inextricably linked by increasing human demands for freshwater [64,65]. In California, irrigated agriculture is the single largest consumer of water, taking 70–80% of stored surface water and pumping great volumes of groundwater [44]. In our study area, agricultural demands account for 50–80% of all water withdrawals [66]. Only late in the last century have the impacts of water diversions on aquatic species become well recognized. However, these impacts are most often assessed on large regional scales, e.g.

major rivers and alluvial valleys, and the large hydroelectric dams, reservoirs, and flood control and conveyance systems that regulate them [67].

Few studies thus far have assessed the impacts of many small agricultural diversions on zero to third order streams and their cumulative effects on a watershed scale [21,22]. On a localized scale, with regional implications, this study detects an emerging threat to not only aquatic biodiversity but also human water security, since surface water supplies most of the water for domestic uses in watersheds throughout Northwestern California [37]. In these watersheds, the concept of "peak renewable water," where flow constraints limit total water availability [68], may have already arrived. In other words, the streams in the study watersheds simply cannot supply enough water to meet current demands for marijuana cultivation, other human needs, and the needs of fish and wildlife.

Due to climate change, water scarcity and habitat degradation in northern California is likely to worsen in the future. Regional climate change projections anticipate warmer average air temperatures, increases in prolonged heat waves, decreases in snow pack, earlier snow melt, a greater percentage of precipitation falling as rain rather than snow, a shift in spring and summer runoff to the winter months, and greater hydroclimatic variability and extremes [69–77]. Consequently, future hydrologic scenarios for California anticipate less water for ecosystem services, less reservoir capture, a diminished water supply for human uses, and greater conflict over the allocation of that diminished supply [70,71,75,78,79]. Climate change is expected to result in higher air and surface water temperatures in California's streams and rivers in the coming decades, which in turn could significantly decrease suitable habitat for freshwater fishes [80–83]. Due to a warming climate, by 2090, 25 to 41% of currently suitable California streams may be too warm to support trout [84].

Already, gage data and climate stations in northwestern California show summer low flow has decreased and summer stream temperatures have increased in many of northern California's coastal rivers, although these changes cannot yet be ascribed to climate change [85]. In an analysis of gage data from 21 river gaging stations, 10 of the gages showed an overall decrease in seven-day low flow over the period of record. This dataset included Upper Redwood Creek as well as the South Fork Eel River, the receiving water body for Redwood Creek South and Salmon Creek [85].

Our analysis suggests that for some smaller headwater tributaries, marijuana cultivation may be completely dewatering streams, and for the larger fish-bearing streams downslope, the flow diversions are substantial and likely contribute to accelerated summer intermittence and higher stream temperatures. Clearly, water demands for the existing level of marijuana cultivation in many northern California watersheds are unsustainable and are likely contributing to the decline of sensitive aquatic species in the region. Given the specter of climate change induced more severe and prolonged droughts and diminished summer stream flows in the region, continued diversions at a rate necessary to support the current scale of marijuana cultivation in northern California could be catastrophic for aquatic species.

Both monitoring and conservation measures are necessary to address environmental impacts from marijuana cultivation. State and federal agencies will need to develop more comprehensive guidelines for essential bypass flows in order to protect rearing habitat for listed salmonid species and other sensitive aquatic organisms. Installation of additional streamflow gages and other water quality and quantity monitoring will be necessary to fill data gaps in remote watersheds. In addition, increased oversight of water use for existing MCSs and increased enforcement by state and local agencies will be necessary to prevent and remediate illegal grading and forest conversions. Local and state governments will need to provide oversight to ensure that development related to MCSs is permitted and complies with environmental regulations and best management practices. Local and state agencies and nonprofit

organizations should also continue to educate marijuana cultivators and the public about the environmental threats, appropriate mitigation measures, and permit requirements to legally develop MCSs and best protect fish and wildlife habitat. Finally, local governments should evaluate their land use planning policies and ordinances to prevent or minimize future forestland conversion to MCSs or other land uses that fragment forestlands and result in stream diversions.

Supporting Information

S1 Table. Number of outdoor plants counted, area of greenhouses measured, and estimated water use in Liters per day for each parcel in the study watersheds.
(XLSX)

S2 Table. Per-watershed daily water demands compared to seven-day low flow by year.
(XLSX)

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Author Contributions

Conceived and designed the experiments: SB MVH LM AC JO. Analyzed the data: JO AC MT SB MVH GL. Wrote the paper: GL JO AC MT SB. Collected the data: AC JO SB MVH GL.

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From: Bill Krawetz <billkrawetz@comcast.net>
Sent: Friday, September 1, 2023 10:55 PM
To: Public Comment@Cannabis
Subject: RE: Comments on NOP for EIR of Commercial Cannabis Cultivation in Mendocino County.
Attachments: Pot Mendo watershed.jpg

Follow Up Flag: Follow up
Flag Status: Flagged

Dear DCC

One more comment provided on NOP for Mendocino EIR for Commercial Cannabis Cultivation:

A CDFW Study identified "POTs growing strain on streams" due to the high concentration of growers in many areas. See attached graph. The graph shows many areas where growers have overlapping water consumption from the same water source. These impacts should be studied in the EIR and appropriate limits placed to safeguard water availability for wildlife and normal residential uses. The "new normal" of drought conditions is the proper baseline.

Thanks again
Bill Krawetz

From: Bill Krawetz [mailto:billkrawetz@comcast.net]
Sent: Friday, September 1, 2023 11:28 AM
To: 'publiccomment@cannabis.ca.gov'
Subject: Comments on NOP for EIR of Commercial Cannabis Cultivation in Mendocino County.

Dear DCC,

The following are comments on what should be included in the EIR study. These items much be evaluated and properly dealt with for the EIR to be valid.

1. Illegal growers- The operations of these growers must be studied and accounted for. It is estimated there are significantly more illegal growers than legal growers. The local law enforcement team reported they only have the resources to deal with ~100 sites per year, yet there are tens of thousands growers. See attached article and highlights below:
   https://www.courier-journal.com/in-depth/news/crime/2021/12/17/mexican-drug-cartels-move-in-on-californias-shadow-marijuana-industry/6036056001/

   Highlights:

Mendocino County Sheriff Matt Kendall told The Courier Journal there are as many as 10,000 illegal grows in his jurisdiction, a two-hour drive north of San Francisco. He tries to target the worst 100, which is all his small force can handle in a year.

"We have international cartels successfully operating here" setting up multi-million dollar farm operations, said California Assemblyman Tom Lackey, R-Palmdale, a former highway patrolman.

"They're poisoning our ground and stealing our water, and we have drought out here," he said.

A glimpse at what he's dealing with: Christopher Wayne Gamble, who allegedly operated large illegal crops near the town of Willits, in central Mendocino County, is charged with murdering a 17-year-old boy and his father who came from Mexico seeking work, according to Mendocino County Superior Court records. detectives found the victims' headless bodies in April in a ditch under a pile of tires that had been set on fire.

Illegal growers are using dangerous chemicals from Mexico that poison animals and contaminate soil.
Armed criminal networks set up illegal grows on federal land in national forests.
Illegal cannabis used to make a nearly pure form of THC is linked to explosions that have burned children and killed adults.

Farmers once fetched up to $4,000 per pound, but a saturated market across the state has driven down prices to $400 or less. Illegal sellers can ship it to get triple the price on the East Coast, Sena said.

A decade ago, 20 acres with a house and barn would have sold for $200,000 or less. Now, it can fetch more than $1 million. "Almost everybody that grows dope up here is from San Jose,"

After doing flyovers, sheriff's investigators estimate there are a million pot plants on the valley floor(Covelo), an area about seven by eight miles. That's less than 2% of the county's landmass. Mexican drug cartels move in on California's shadow marijuana industry. The sheriff estimates that 95% are illegal

"Some of the marijuana being moved across the country is born on the back of slave labor," said Sena, who also heads up the Northern California Regional Intelligence Center. "Often the people brought in to do labor are mistreated" on illegal marijuana farms. Other farm workers, including young men used for sex and labor trafficking, weren't rescued in time. Some were forced to live in squalor without plumbing. Others ended up dead and many are missing, the sheriff said.

An average of more than 2 million cannabis plants were eradicated on federal land from 2007-2019 — more than a million of which was grown in California, Gabriel said.

2. Water impacts: Study the impacts of cannabis water usage on steam depletion and the impacts to wildlife and residents.
    a. CDFW study: "Impacts of Surface Water Diversions for Marijuana Cultivation on Aquatic Habitat in Four Northwestern California Watersheds" Included Mendocino County: See attached report. Highlights:
        i. Our results indicate that water demand for marijuana cultivation has the potential to divert substantial portions of streamflow in the study watersheds, with an estimated flow reduction of up to 23% of the annual seven day low flow in the least impacted of the study watersheds. Estimates from the other study watersheds indicate that water demand for marijuana cultivation exceeds streamflow during the low-flow period.
    b. Nature Conservancy/others study on Navarro River area. See attached report. Highlights:
        i. points out the linkage between reduction in streamflow with groundwater pumping. In the Navarro study wells 3/4 mile away from a stream have a big impact. The study seems to use actual sites but estimates of usage.

ii. Cannabis wells cause a disproportionate amount of stream depletion. Cannabis well are less than 25% of total wells (18% of total) but caused over 50% of depletion. The study looks at both Cannabis and Residential uses
iii. Residential uses cause ~5X depletion of cannabis. But there are approximately 4.3x more Residential well (1314 total) than cannabis wells (302 total)
    1. Comment: Comparing Residential use to cannabis use might be misleading. Residential use includes drinking, cooking, bathing, toilets, gardens, etc. Cannabis is one discretionary use.
iv. Streamflow depletion increases nonlinearly when pumping within ¾ mile of stream. Most wells (over 50%) within this range
v. Streamflow depletion worse in late summer when groundwater is a critical source of base flow to ecologically important streams. Residential and Cannabis use peak in Summer
vi. Stream depletion mainly caused by well distance from stream and well usage. Subsurface properties such as transmissivity are next important

3. Fire Safe Road regulations: Commercial Cannabis Cultivation operations must adhere to and only be allowed to operate in locations that met the Fire Safe Regulations:
    a. Summary of Updated State Minimum Fire Safe Regulations, Comments from Board of Forestry's Final Statement of Reasons August 17, 2022
    b. Synopsis:
        i. The State Board of Forestry and Fire Protection (BOF) unanimously approved the updated State Minimum Fire Safe Regulations (FSR) at its August 17, 2022, meeting. These regulations retain the identical road regulations as in the current 2020 FSR. This includes 20 ft wide roads, dead-end roads no longer than 800 ft to 1 mile, as well as many other specifications. The BOF, as well as the California Attorney General's Office, decisively confirmed that the FSR apply to all existing roads, and cover access to as well as within a parcel. The Exception process must follow strict requirements with material facts to demonstrate Same Practical Effect within a development perimeter. For subpar public roads needing improvement to meet the FSR, it's up to the county to determine either if the county will pay or if it requires the applicant to pay, or if no upgrades are made, to prevent the development from proceeding.
    c. Relevant Excerpts from the State Fire Safe Regulations and the Final Statement of Reasons.
        i. The State Board of Forestry and Fire Protection (BOF) unanimously approved minor revisions to the State Minimum Fire Safe Regulations (FSR) at its August 17, 2022, meeting and the Final Statement of Reasons (FSOR), for formal processing by Office of Administrative Law. These regulations govern all new development in the State Responsibility Area (SRA) as well as Very High Fire Hazard Severity Zone (VHFHSZ) in the Local Responsibility Area (LRA). The revised regulations retain the identical road regulations as are in the current 2020 FSR, including:
        ii. • Minimum 20 ft wide roads for all 2-way roads (two 10-ft wide traffic lanes excluding striping and shoulders)
        iii. • Dead end roads no longer than 800 ft, 1320 ft, 2640 ft or 1 mile, depending on smallest parcel served (i.e., ranging from 800 ft dead-end length limit if any parcel served is less than 1 acre, to 1 mile dead-end length limit if all parcels served are 20 acres or more)
        iv. • Grades of no more than 16%, up to 20% with mitigations
        v. • Specifications for curve radius, bridge weight ratings, gates, road surface, turnouts, turnarounds
        vi. • Length of 1-way roads no longer than 1/2 mile, plus other requirements including to connect with 2-way roads (i.e., minimum 20 ft wide) at each end
        vii. • Only 20 ft wide roads, not 10 ft wide driveways, can access any commercial facility
        viii. • Must provide for safe concurrent fire apparatus ingress and civilian evacuation, and unobstructed traffic circulation during a wildfire
    d. Exceptions can be applied for by applicants within a parcel or development perimeter (e.g., on private roads), but only if applicants provide material facts demonstrating the Same Practical Effect within that

perimeter as provided by the standards enumerated (see above) in the FSR (FSR § 1270.07; FSOR p. 593).

e. Local regulations must at minimum meet the criteria of the FSR. Local jurisdictions cannot apply exemptions not set forth in the FSR (such as exempting existing or pre-1991 roads as sought by Sonoma County in its 2020 ordinance, which the BOF accordingly refused to certify) (§FSR § 1270.05; FSOR p. 594).

f. Public roads must also meet the minimum FSR for any new development to occur. There is no mechanism specified in the FSR for Exceptions on public roads outside a development or parcel perimeter. BOF has previously explained that if improvements are needed to such public roads, it's up to the county to determine whether such improvements are paid for by the developer or the county (October 23, 2020, letter from BOF to Sonoma County Counsel). If not in compliance, then the new development cannot occur if accessed by subpar public roads.

g. The FSR apply equally to public and private roads (FSR § 1270.01(y); FSOR pp. 5-7). BOF has also reiterated a 2019 California Attorney General's letter confirming that the FSR apply to existing public access roads leading to a proposed development that are beyond the development perimeter (FSOR pp. 6-7). BOF reiterated these statements in response to and thus contradicting assertions in a May 27, 2022, letter to BOF from Rural County Representatives of California (RCRC). RCRC erroneously claimed that the FSR only applied to the limited area within a parcel or development perimeter and not to existing roads outside the perimeter, misapplying the BOF definition of "Defensible Space". However, RCRC failed to note that the BOF definition of Defensible Space is limited to applicability of Exceptions, not to scope. Importantly, neither that definition nor Exceptions are included in nor limit the scope of the underlying code PRC 4290. Rather, BOF wrote both definitions to delineate a mechanism for requesting Exceptions within a parcel or development perimeter. RCRC wrongly tried to apply this specific narrow definition of Defensible Space – to reiterate, which definition is limited only to Exceptions in the FSR - to instead limit the scope, despite that scope was never so limited by BOF in the FSR as that would violate PRC 4290. Furthermore, as the vast majority of roads providing access to new development are outside a parcel/development perimeter, the entire Article 2 of the FSR, which encompasses extensive road specifications (i.e., road widths, curve radius, turnarounds, grade limits, bridge weight limits, dead-end road limits across multiple parcels, etc.), would be essentially meaningless if the FSR were limited to within a parcel or development perimeter (where the infrastructure is mainly driveways and occasionally a private road). Sonoma County should not rely on RCRC's flawed and indefensible argument in its May 27 letter, which was refuted by BOF in the FSOR (p.557).

h. It is important to understand that roads only need to meet the FSR for new development (residential, commercial, or industrial); roads do not need improvement for existing development. As the FSR have been state law since 1991, any new development after 1991 should have only been on roads meeting the FSR. Unfortunately, this was not always the case in Sonoma County.

i. The County must adhere to state law in the FSR for all new development. If an Exception is requested, it must follow the requirements of the FSR including with material facts supporting that it provides the Same Practical Effect as the standards enumerated in the FSR (§ 1270.07; FSOR, p. 593). As noted above, such Exceptions are limited to roads and driveways within a parcel or development perimeter. The County has violated the FSR and Exceptions provision on many approvals including several in 2021, approving new development accessed solely by subpar public roads, and stating that Exceptions were documented providing Same Practical Effect when in fact the public record confirmed that no such Exception documents exist. We hope going forward that the County will adhere to the FSR.

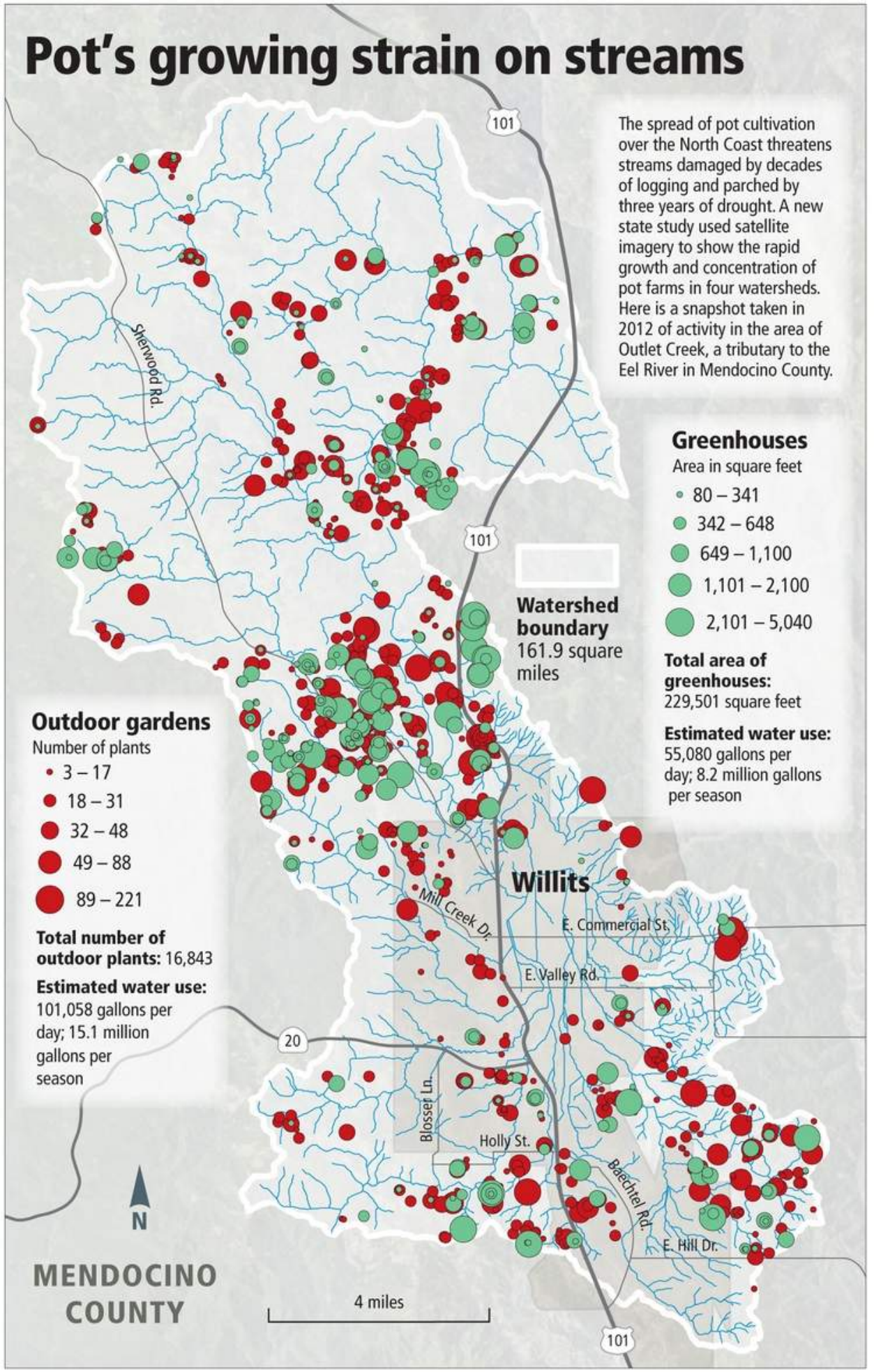
j. To assist counties, the BOF has agreed to work with CalFire leadership on training for CalFire employees and local jurisdictions on correct implementation of the FSR. Such training will benefit the County in streamlining its development approval processes, including correctly applying the FSR to existing roads both within and outside a parcel or development perimeter, and on preventing abuse of Exceptions which would undermine the intent of the FSR.

4. <u>The DCC NOP document provides little definition</u>:

a. NOP states “The NOP provides sufficient information describing the Project and its potential environmental effects to allow recipients the opportunity to provide a meaningful response related to the scope and content of the EIR” and provides the following Project Description: PROJECT DESCRIPTION
    i. The DCC has issued approximately 608 provisional commercial cannabis cultivation licenses in Mendocino County. The Project consists of the DCC actions to approve annual licensing of such commercial cannabis cultivation operations in Mendocino County under California Code of Regulations, title 4, section 15002.The EIR will programmatically evaluate the environmental impacts of the DCC’s annual licensing of commercial cannabis cultivation operations in the county as well as the environmental impacts of future licensed commercial cannabis cultivation operations.
b. Considering the NOP is only 3 pages long and written at a very high level, it is difficult to impossible for the public to fully understand the full scope to properly comment.

Thanks
Bill Krawetz

Pot's growing strain on streams



Source: California Fish and Wildlife Department

LOREN DOPPENBERG / For The Press Democrat

August 31, 2023

Department of Cannabis Control
c/o Angela McIntire-Abbott
2920 Kilgore Road,
Rancho Cordova, CA 95670
publiccomment@cannabis.ca.gov.

SUBJECT: Comments Regarding the Department of Cannabis Control (DCC) Proposed Draft Environmental Impact Report for the Licensing of Commercial Cannabis Cultivation in Mendocino County, California.

This letter presents comments regarding a proposed Draft Environmental Impact Report (DEIR) for the Licensing of Commercial Cannabis Cultivation in Mendocino County, California. The California Geological Survey (CGS) is a division within the Department of Conservation which in turn is part of the Natural Resources Agency, a responsible agency within California State Code responsible for Land Use. The Department of Conservation (DOC) regulates specific aspects of oil, gas, and geothermal energy production; surface mining operations and associated land reclamation; and establishes regulatory zones related to certain seismic hazards that can impact local land use (https://www.conservation.ca.gov/cgs/minerals, https://www.conservation.ca.gov/cgs/sh).

A program within CGS, named the Forest and Watershed Geology Program (FWG, https://www.conservation.ca.gov/cgs/fwg) is part of a multi-agency review group that performs engineering geologic review of timber harvest projects in California. Our work involves evaluating proposed land use (timber harvesting and land conversions) relative to potential adverse impacts to public safety and the environment. Some of our engineering geologic evaluations have included requests from our multi-agency partners (CAL FIRE, Regional Water Quality Control Boards, Department of Fish and Wildlife) regarding public safety and grading operations within cannabis cultivation operations in Mendocino County (referenced below).

CEQA versus Geologic Hazards

While the California Environmental Quality Act (CEQA) contains a section about Geology and Soils, DEIRs sometimes don't address the slope stability and engineering aspects of a project, instead providing general descriptions about the geologic and soil conditions underlying a project area.

Slope stability can be thought of as the factors that tend to keep a hillslope in place (for example friction, competent rock strength, and low slope gradients) versus factors that tend to cause a hillslope to fail (for example the force of gravity, water, and steep slope gradients). Only California licensed Professional Geologists (PG), California Certified

Engineering Geologists (CEG) and Civil Engineers (PE) are qualified to evaluate proposed grading projects with regard to slope stability in California (see CA 2023 Geology and Geophysical Act, accessed at https://www.bpelsg.ca.gov/laws/gg_regs.pdf., and CEQA Article 9, Sec.15149. Use of Registered professionals in Preparing EIRs

Grading projects typically include movement of earth materials that can affect slope stability. **Excavating** (digging) into a slope can adversely impacts slope stability by undermining or removing support from material above the area of excavation. **Placing** fill materials on or above steep slopes can adversely impact slope stability by increasing the mass on steep slopes. The introduction of water (**ponding**) into the ground can adversely impact slope stability by saturating and weakening the internal strength of the underlying earth materials.

The potential failure of developed slopes onto infrastructure (for example homes, roads, transmission lines) poses a risk to the safety and welfare of people located downslope of a grading project. Slope failure will likely incur costs required mitigate potential slope failures. Reference herein are several evaluation reports by CGS regarding unpermitted grading projects in Mendocino County resulting from cannabis operations that threatened downslope properties. We also attach these reports as an appendix to this comment letter. The evaluation reports referenced here occurred without grading permits.

The crossing of watercourses can potentially affect aquatic habitat if the crossings are not properly designed and evaluated. Sediment delivery associated with land use activities can occur if geologic, meteorologic and slope conditions are not taken into consideration.

Mendocino contains several active faults including the San Andreas Fault Zone and the Maacama Fault. The location of these faults plays a role in proposed land use. Placing infrastructure over the faults can cause harm to the infrastructure, human life and the environment.

Finally, excavation and inhalation of earth materials contain **Naturally Occurring Asbestos (NOA),** and other hazardous minerals can produce hazardous working conditions. NOA and other hazardous minerals can affect the public off-site of the project through dust generated by project activities being carried to nearby residential and public use spaces.

Comments

Comment 1: Mendocino County contains areas underlain by landslides and unstable ground. The DEIR should discuss hazards associated with land use on ground containing landslides and unstable ground. The DEIR should discuss how to identify these areas, who is qualified to evaluate proposed operations in these areas, and who is qualified to recommend mitigations in these areas. https://www.conservation.ca.gov/cgs/maps-data

Comment 2: The DEIR should include discussion and mitigation regarding slope stability and proposed grading operations associated with cannabis operations. The discussion

should include both the public safety impacts and environmental impacts. The DEIR should demonstrate and discuss an understanding of the licensure and laws regarding Professional Geologists and Professional Engineers and how it applies to land use. The DEIR should discuss how mitigation of proposed projects would require adequate and independent review by California licensed professional geologists, engineering geologist and professional engineers.

Comment 3: The DEIR should include discussion and mitigation regarding seismic hazards in Mendocino County. The discussion should include both the public safety impacts and environmental impacts relative to proposed land use for cannabis production. The DEIR should demonstrate and discuss an understanding of the licensure and laws regarding Professional Geologists, Engineering Geologists and Professional Engineers and how it applies to land use. The DEIR should discuss how mitigation of proposed projects would require adequate and independent review by California licensed professional geologists, engineering geologists and professional engineers.

Comment 4: Mendocino County contains areas underlain by Naturally Occurring Asbestos (NOA). The DEIR should discuss hazards associated with land use on ground containing NOA and other hazardous minerals and gasses. The DEIR should discuss how to identify these areas, who is qualified to evaluate proposed operations in these areas, and who is qualified to recommend mitigations in these areas.
https://www.conservation.ca.gov/cgs/minerals/mineral-hazards/asbestos

Comment 5: The DEIR should recognize that the CGS manages and contains an inventory of geologic maps, landslide maps, seismic data, mineral data and other information regarding Mendocino County. CGS should be consulted regarding providing this information as needed.

For more detailed information please contact us during EIR preparation.

References:

CA 2023 Geology and Geophysical Act, accessed at https://www.bpelsg.ca.gov/laws/gg_regs.pdf.

California Geological Survey (CGS), 2007, Preliminary Engineering Geologic Review of Recent Grading, 6401 Canyon Road, Willits, CA, dated September 13, 2007.

California Geological Survey (CGS), 2010, Engineering Geologic Evaluation of 6401 Canyon Road, Willits, CA, Non-permitted activity 1-05NON-018 MEN, Case Number 07MEN 7166-48, Mendocino County, California, dated September 28, 2010.

California Geological Survey (CGS), 2010, Preliminary Focused Engineering Geologic Review of Proposed Road Grading, 900 and 1111 Doolin Canyon Drive, Ukiah, CA, Cal Fire ID 1-09NON-005 MEN, dated March 22, 2010.

Department of Cannabis Control
c/o Angela McIntire-Abbott

August 31, 2023

California Geological Survey (CGS), 2011, Engineering Geologic Assessment of Grading Operations at 29880 and 30010 Highway 101, Willits, CA; Cal Fire LE Case # 11CAMEU004127-46, dated August 11, 2011.

California Geological Survey (CGS), 2011, Engineering Geologic Assessment of Grading Operations at 29230 North Highway 101, Willits, CA; Cal Fire # 1-12NON-011 MEN dated May 30, 2011.

California Geological Survey (CGS), 2012, Engineering Geologic Assessment of Grading Operations at 70100 Arnett Drive, Leggett, CA; Cal Fire Case # 12CAMEU 005419-35, dated August 23, 2012.

8/31/2023

DocuSigned by:
David Longstreth
54F8C8D3098D441...

Date

David Longstreth, CEG 2068
Senior Engineering Geologist
Santa Rosa, California

Attachments (Appendix A)

Department of Cannabis Control
c/o Angela McIntire-Abbott

August 31, 2023

APPENDIX A

DEPARTMENT OF CONSERVATION
CALIFORNIA GEOLOGICAL SURVEY

17501 N. Highway 101 • Willits • CALIFORNIA 95490
PHONE 707/456-1814 • **FAX** 707/456-1817 • **WEBSITE** conservation.ca.gov

Memorandum

To: William Snyder, Deputy Director
California Department of Forestry
and Fire Protection
135 Ridgway Avenue
Santa Rosa, California 95401

Date: September 13, 2007

From: Department of Conservation
Division of Mines and Geology
17501 N. Highway 101
Willits, CA 95490

Subject: Preliminary Engineering Geologic Review of Recent Grading, 6401 Canyon Road, Willits, CA.

Time Spent on Review: 1h field, 1h. office

Participants-Affiliation:
Dave Longstreth – CGS

Inspection Date: September 12, 2007

County: Mendocino

Watershed: Tributary to Tomki Creek

Quadrangle: Willits 7.5' quadrangle

Legal Description: Portion of Section 12, T18N, R13W.

Reason for inspection: At the request of CDF forester Jeanette Pederson, CGS conducted a drive-by visual review of grading activities at 6401 Canyon Road, Willits, CA. On-site inspection was not conducted because of complications regarding access to the site. The purpose of the visual review is to observe possible impacts to slope stability and soil erosion that could potentially impact public safety or had the potential for delivering sediment to a watercourse. This review is to assist CDF in its investigation of a possible Forest Practice violation.

This memorandum follows a visual review of the property from Canyon Drive and does not represent an Engineering Geologic Report.

References:

Durham, J., 1979, Willits 15' Quadrangle: California Department of Forestry, Title II Geologic Data Compilation Project, Unpublished, scale 1:62,500.

Geologic Conditions:

Durham (1979) maps undifferentiated units of the Jurassic and Cretaceous age Central Belt of the Franciscan Complex as underlying the site area. The undifferentiated Central Belt of the Franciscan Complex, is described as consisting of blocks of gray-green consolidated greywacke, siltstone, mudstone, conglomerate, greenstone, chert, and schist

surrounded by a clayey matrix. The undifferentiated Central Belt is considered highly sheared and broken.

Observations:

Recent Grading. Recent road building, clearing, and grading have occurred at the site. Among these is a roughly rectangular shaped area (visually estimated to be on the order of about 100 feet wide and 200 feet long) on slopes greater than 50% that descend to an unnamed tributary to Tomki Creek in Berry Canyon. The grading appears to have removed all vegetation, leaving a bare planar slope that appears to be mantled with loose soils of unknown thickness. It appears likely that significant erosion is likely to occur as a result of next winter's rains if no erosion control work is conducted on the recently graded area, and that the potential for soil slips and mudslides that toe into the Tomki Creek tributary appears high. Canyon Road (a county road) crosses the tributary via a culvert a few hundred feet downstream of the bare rectangular area.

A driveway that provides access to the site also appears to have been recently graded. The driveway includes switchback turns across slopes estimated to be inclined more than 50% that descend to Canyon Road and has vertical cuts that are about 5 feet high. No erosion control measures were observed and it is unknown if any are installed on the portion of driveway that is out of view from Canyon Road. Drainage from the driveway has access into the tributary of Tomki Creek and will likely deliver sediment and possibly adversely impact downstream drainage facilities if proper erosion control methods are not implemented. In addition to the geologic observations, this visual review observed piles of bucked logs and branches that are precariously stored behind trees on steep slopes (50%+) that descend to Canyon Road.

Public Safety.

If sediment is eroded from the graded area it could plug down stream culvert and has a significant potential to affect Canyon Road. Downstream residents, especially the residence adjacent to the culvert crossing northwest of the subject property, may temporary loose access to the road and could possibly be flooded. The bucked wood piles placed behind trees on the steep slopes that descend to Canyon Road may roll onto the road if any windfall occurs. This appears to pose a hazard to motorist that use the road.

Recommendations:

Based on the visual review of the property from Canyon Road, CGS recommends the following:

- An on-site visit by CDF, CGS, DFG, and the Regional Water Quality Control Board to more fully evaluate potential problems at the site.
- Development of an erosion control plan for bare areas, the driveway, and other areas where grading has occur by a Professional Geologist or Professional Engineer that is reviewed by Review Team agencies, with implementation completed before this winters rainy season.
- Removal of all logs stored behind trees on the slope that descends to Canyon Drive.

CGS also recommends that a copy of this memo be provided to the Mendocino County Department of Building and Planning.

Comments to County of Mendocino:

Issues regarding slope stability and impacts to public safety and a County of Mendocino road are discussed in this memo. It is therefore suggested that the county be aware of these issues and take action as necessary to protect public safety.

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original signed by
David Longstreth, CEG # 2068
Associate Engineering Geologist

Concur
9/13/07 *original signed by*
Date, Thomas E. Spittler, CEG 1078
Senior Engineering Geologist

DEPARTMENT OF CONSERVATION
CALIFORNIA GEOLOGICAL SURVEY

17501 N. Highway 101 • Willits • CALIFORNIA 95490
PHONE 707/456-1814 • **FAX** 707/456-1817 • **WEBSITE** conservation.ca.gov

Memorandum

To: William Snyder, Deputy Director
California Department of Forestry
and Fire Protection
135 Ridgway Avenue
Santa Rosa, California 95401

Date: March 22, 2010

From: Department of Conservation
Division of Mines and Geology
17501 N. Highway 101
Willits, CA 95490

Subject: Preliminary Focused Engineering Geologic Review of Proposed Road Grading, 900 and 1111 Doolin Canyon Drive Ukiah, CA, Cal Fire ID 1-09NON-005 MEN.

Time Spent on Review: 4h field, 8h. office

Inspection Date: March 3, 2010

County: Mendocino

Quadrangles: Ukiah and Elledge Peak 15 minute quadrangles

Participants-Affiliation:
Mrs. Carolyn Tandy – Property Owner at 900 Doolin Canyon Drive
Jeanette Pedersen – Cal Fire inspector
Dave Longstreth – CGS

Watershed: Doolin Creek, tributary to the Russian River

Legal Description: Portion of Section 30 , T15N, R12W; and Portion of Section 25 T15N, R13W, MDBL&M.

Synopsis: Reportedly 4 years ago the landowner at 1111 Doolan-Canyon Drive (Arbeeny) constructed an access road, a portion of which traverses through the adjacent property at 900 Doolan Canyon Drive (See Figures 1 and 2). The existing road contains steep pitches (ranging from 30 to 40± percent) and was constructed without permit. Based on conversation with the Mendocino County Planning Department no road rights exist that permit construction through 900 Doolan Canyon Drive. It is our understanding that the person responsible for constructing the road, Mr. Arbeeny, is attempting to have the road permitted. CAL FIRE, part of the permitting process, found the existing road to be improperly drained, resulting in sediment delivery to Doolan Creek. They also observed that the road is very steep and may not allow fire engine access (CAL FIRE's Fire Prevention staff may have to assess the road relative to Fire Safe Regulations). As such, Mr. Arbeeny hired a civil engineer who prepared plans for a new road that is less steep and located lower on site slopes (Pope Engineering, 2010). CAL FIRE requested CGS to conduct a visual review of proposed grading activities relative to possible impacts to slope stability and soil erosion that could potentially impact downstream properties (public safety) and the potential for delivering sediment to a watercourse (habitat).

References:

Blake, M.C., and Jones, D.L., 1981, *The Franciscan assemblage and related rocks in northern California*, in Ernst, W.G., editor, The geotectonic development of California – Rubey Volume I: Englewood Cliffs, New Jersey, Prentice-Hall, Inc.

Kelsey, 1998, *Formation of Inner Gorges*: Catena, Vol 15, p.433-458.

Pope Engineering, 2010, Improvement Plans, Andrew Arbeeny, 1111 Doolan Canyon Drive, Ukiah, California.

Reid et al, 2003, *Debris-flow initiation from large, slow-moving landslides*: Debris-Flow Hazards Mitigation: Mechanics, Prediction, and Assessment, Rickenmann& Chen (eds).

Swanson and Swanson, 1977, *Complex mass-movement terrains in the western Cascade Range, Oregon*: Geological Society of America, Reviews in Engineering Geology, Volume III.

Sydnor, R.H., and Sowma-Bawcom, J.A., 1991, *Landslides and Engineering Geology of the western Ukiah area, central Mendocino County, California*, Landslide Hazard Identification Map No. 24, California Division of Mines and Geology Open File Report 91-16, scale 1:6,000.

Aerial Photographs Inspected:

CDFI, 1947, Black and white aerial photographs, Roll 3, Frames 5, 6, nominal scale 1:20,000.

CVN, 1952, Black and white aerial photographs, Roll 12K, Frames 9, 10, nominal scale 1:20,000.

Cartwright,1964, Black and white aerial photographs, Mendocino County Flight, Roll 16, Frames 101, 102; nominal scale 1:20,000

CDF ALL-UK, 1981, Black and white photographs, Flight CDF ALL-UK, Roll 31, Frames 7, 8, nominal scale 1:24,000.

WAC Inc., 1984, Black and white photographs, Flight WAC-84C, Roll 15, Frames 236, 237, nominal scale 1:12,000.

WAC Inc., 1988, Black and white photographs, flight WAC CA 88, Roll 14, Frames 212, 213; nominal scale 1:31680.

WAC Inc., 1992, Black and white photographs, Flight WAC-MENDOCINO-96, Roll 29, Frames 179, 180, nominal scale 1:12,000.

WAC Inc., 2000, Black and white photographs, Flight WAC-00-CA, Roll 3, Frames 286, 287; nominal scale 1:31,680.

Geologic Conditions:

The subject properties consist of two parcels (1111 and 900 Doolan Canyon Drive, Figure 1) both of which are on steep slopes that flank Doolan Creek, a Class I tributary to the Russian River, a 303(d) listed watercourse. Sydnor and Sowma-Bawcom (1991) map Lookout Peak graywacke as underlying the site area. The Lookout Peak greywacke, part of the Jurassic and Cretaceous age Central Belt of the Franciscan Complex, is described as consisting of elongated blocks of greywacke sandstone engulfed in sheared shale. Bedrock observed during the site visit consisted of loose and pervasively jointed mudstone and greywacke sandstone. Scattered resistant boulders of what appears to be metavolcanic

rock were observed outcropping from site slopes. In general the Central Belt of the Franciscan Complex is considered sheared and broken (Blake, 1981).

A 22± acre landslide is mapped on the north facing slope that descends to Doolan Creek in the subject site area (shown on Figure 2). The landslide was interpreted by review of the historical set of aerial photographs (sets 1947 through 2000) and by hummocky topography observed at the site. The landslide, a deep-seated translational/rotational rock slide – earthflow complex is likely characterized by imperceptible and slow progressive ground deformation on a subsurface slip plane or basal shear zone. Deep-seated landslides typically toe and bulge into watercourses forming steep slopes that may be susceptible to shallow landslide movement (Reid et al, 2003).

Site slopes were observed to be steep ranging from 75 to 95± percent where they toe into Doolan Creek and evidence of shallow seated landsliding was observed during the site visit. A debris flow scar was observed on the slopes that toe into to Doolan Creek (shown on Figure 2). The slide scar appears as a an arcuate head scarp about 30 feet wide that narrows to a scour path about 5 to10 feet wide descending approximately 300 feet to Doolan Creek. The slide is vegetated with brush and grass and appears suspended at this time. The slide is visible in the 2000 areal photos, but not in the 1992 photos. Debris flows are formed by failure of water-charged soil, rock, and organic material down steep stream side slopes and channels. They commonly occur during high intensity storms. Debris may be deposited as a tangled mass of large organic material and sediment once momentum of debris is lost.

Inner gorge geomorphology was observed on the slopes that descend to Doolan Creek. Kelsey (1988) describes the formation of inner gorge geomorphology as a process where a stream down cuts through rock, resulting in an abrupt change in slope angle, with steep channel banks and upper, less steep valley slopes. In the California Coast Ranges, Kelsey (1988) describes a mechanism of inner gorge formation controlled by tectonic uplift, climate, and underlying rock characteristics. This process occurs over a geologic time scale of thousands to hundreds of thousands of years and can be temporally and physically intermittent depending on controlling factors.

The steep slopes along Doolan Creek in the subject site area appear to be underlain by weak and sheared bedrock that is inherently prone to deep-seated and shallow seated landslide processes. Human activities, such as road construction, on slopes such as these may adversely impact slope stability (Swanson, 1977). Such adverse impacts can result in accelerated land movement, additional landsliding, sediment delivery, and adverse impacts to habitat and public safety.

Proposed Road Construction: An approximately 150 foot long road is proposed to be constructed across the steep (75 to 95± percent) north facing slopes that toe into Doolan Creek (shown on Figure 2). The road is proposed to be constructed about 20 to 80 feet downslope from the existing road, which is proposed to be abandoned. The road, described by a set of plans prepared by Pope Engineering, dated February 11, 2010, presents several concerns relative to proposed construction and its impacts on slope stability and public safety (listed below):

- The construction plans appear to lack details regarding grading techniques, for example whether the road construction will utilize full bench or cut and fill grading techniques.
- The construction plans indicated that the existing road is proposed to be abandoned, however, they provide no details regarding techniques to be used to complete the abandonment.
- The uniform topography shown on the plans do not appear to reflect existing topography observed in the field.
- The plans do not include or incorporate a geotechnical analysis. Cuts and fills on steep slopes will be susceptible to failure with out proper geotechnical design. The plans do not address how the proposed road construction could affect the slope stability of the existing (upslope) road, how abandonment of the existing road may affect slope stability, or how the combination of both new road construction and existing road abandonment will affect slope stability. Such designs usually include slope stability analysis performed by both a California Certified Engineering Geologist and Licensed Geotechnial Engineer.

Existing access road. Based on site observations several concerns regarding the existing access road regarding were noted and are listed below:

- The road crosses Doolin Creek with a low lying bridge that appears to be constructed with a railroad car or flat bed truck base and logs. The bridge does not appear to be supported by foundations and lies on ground that appears to be subject to stream side erosion and scour (see photograph 1). Eventual failure and collapse of the bridge appears possible without additional design and repair.
- The existing access road ascends from the bridge at a steep gradient (greater than 30 percent), is paved with asphalt, insloped, and appears to have minor to moderate erosion along the inside portion of the road (photograph 2). The road that enters the Arbeeny parcel, is unpaved, and traverses across 75 to 95 percent slopes for several hundred feet before switch backing to a few building pads (photograph 3). The unpaved portion of road appears to be eroding and delivering sediment on the order of tens to hundreds of cubic yards to Doolan Creek, a Class I watercourse. No erosion control measures appear to be in place and additional sediment delivery appears likely. The lower paved portion of existing road appears relatively more stable than the unpaved upper portion of existing road.

Domestic Water Supply. A domestic water supply is located in Doolan Creek directly below the proposed construction. The water supply consists of a pipe that gravity feeds water to a tank that supplies water to downstream residents. Reportedly the water is used for irrigation purposes. The Domestic Water Supply located in Doolan Creek, directly below the proposed construction, appears at risk from landsliding or rock failure.

Public Safety. The residences down stream of the proposed construction appear to be at hazard from landsliding, flooding, mudslides, and other adverse impacts that could be initiated by the propose construction activities. This includes the residence at 900 Doolan Canyon Drive.

Recommendations:

Based on the visual review of the subject properties, CGS recommends the following:

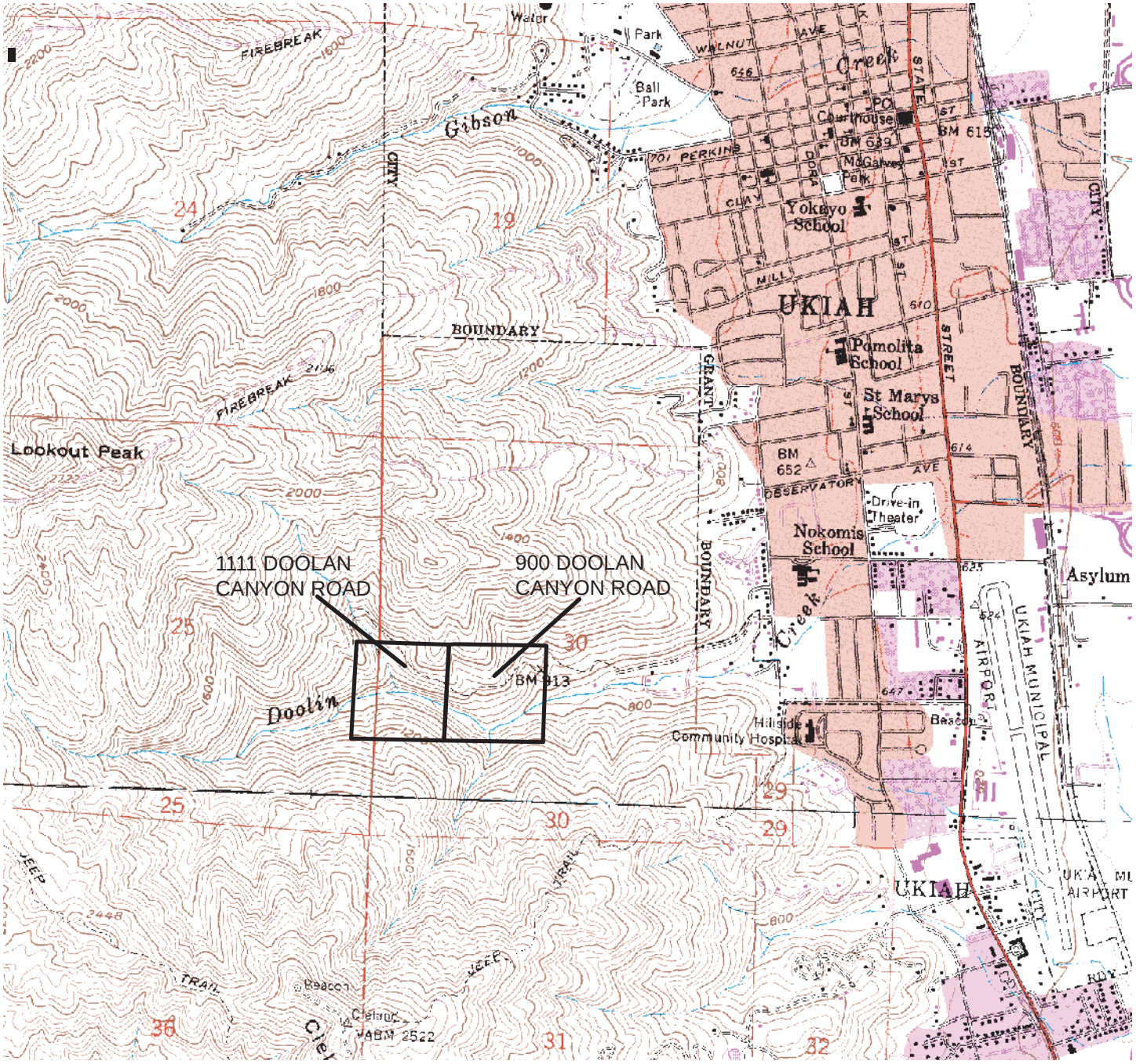
- The proposed road as currently designed by Pope Engineering (2010) is inadequate and should not be permitted.
- A detailed geologic investigation of site slope including subsurface investigation should be conducted relative to the proposed road construction and abandonment of the existing road.
- A detailed geotechnical analysis of the proposed road construction and existing road abandonment that includes laboratory testing of rock strength and a slope stability analysis should be conducted. Such analysis should include cut slope stability and fill slope stability, including detailed and accurate cross sections that illustrate existing and proposed conditions.
- Prior to approval by the County of Mendocino the geotechnical and geologic reports should receive independent third party review.
- Development of an erosion control plan for existing access road should be conducted. The erosion control plan should be prepared by a Professional Geologist or Professional Engineer and should be reviewed by Review Team agencies.
- The existing bridge is inadequately supported and should be removed before failure or upgraded to county standards.
- A copy of this memo should be provided to the Mendocino County Department of Building and Planning and downstream residents.

Comments to County of Mendocino:

Issues regarding slope stability and impacts to public safety are discussed in this memo. It is therefore suggested that the county be aware of these issues and take action as necessary to protect public safety.

original signed by
David Longstreth, CEG # 2068
Certified Engineering Geologist

Concur
03-22-10 original signed by
Date, Thomas E. Spittler, CEG 1078
Senior Engineering Geologist



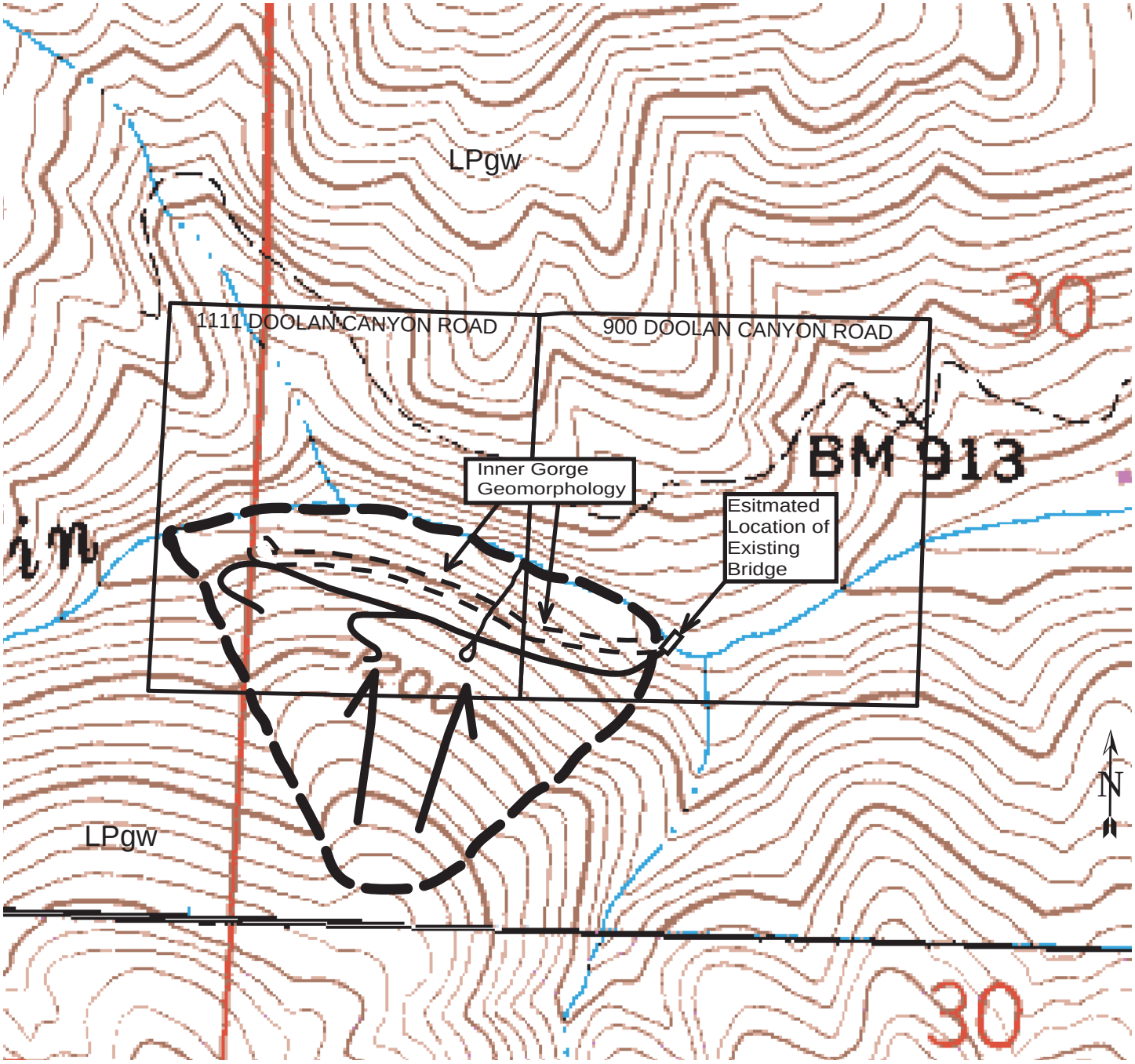
Explanation

= Estimated Parcel Boundary

N

Base Maps: Portions of Ukiah and Elledge Peak 7.5 Minute USGS Quadrangles, photorevised 1975.

Date: March 2010	Location Map To Accompany Engineering Geologic Review of Proposed Road through the Properties at 900 and 1111 Doolan Canyon Road	Figure: 1
Scale: 1" = 2000'		
0 1000' 2000'		



Explanation

Rotational/Translational Landslide

Estimated Location of Proposed Road

Estimated Parcel Boundary

Debris Flow/Torrent Track

Estimated Location of Existing Road

LPgw = Lookout Peak graywacke

Date: March 2010 Scale: 1" = 500' 0 250' 500'	Site Map To Accompany Engineering Geologic Review of Proposed Road Through Properties at 900 and 1111 Doolan Canyon Road, Ukiah, CA	Figure: 2

Photograph 1. Existing Bridge at 900 Doolan Canyon Drive.
Photograph by CGS, March 3, 2010

Photograph 2. Paved road ascending from bridge.
Photograph by CGS, March 3, 2010.

No Scale	1-09NON-005 MEN, Photographs 1 and 2.	Figure: 3

Photograph 3. Erosion on existing unpaved access road,
1111 Doolan Canyon Drive. Photograph by CGS, March 3, 2010.

No Scale	1-09NON-005 MEN, Photograph 3.	Figure: 4

DEPARTMENT OF CONSERVATION
CALIFORNIA GEOLOGICAL SURVEY

17501 N. Highway 101 • Willits • CALIFORNIA 95490
PHONE 707/456-1814 • **FAX** 707/456-1817 • **WEBSITE** conservation.ca.gov

Memorandum

To: Jeanette Pedersen
California Department of Forestry
and Fire Protection
17501 N. Highway 101
Willits, CA 95490

Date: September 28, 2010

From: Dave Longstreth
Department of Conservation
Division of Mines and Geology
17501 N. Highway 101
Willits, CA 95490

Subject: 6401 Canyon Road, Willits, CA, Non-permitted activity 1-05NON-018 MEN, Case Number 07MEN 7166-48

Pursuant to your request the following is a brief introduction of the concept of slope stability and observed conditions that affect slope stability at the subject site.

Introduction: Slope stability can be thought of as the factors that tend to keep a hillslope in place (for example friction, competent rock strength, and low slope gradients) versus factors that tend to cause a hillslope to fail (for example the force of gravity, water, and steep slope gradients).

Excavating (digging) into a slope can adversely impacts slope stability by undermining or removing support from material above the area of excavation.

Placing fill materials on or above steep slopes can adversely impacts slope stability by increasing the mass on steep slopes.

The introduction of water (**ponding**) into the ground can adversely impact slope stability by saturating and weakening the internal strength of the underlying earth materials.

Observed Conditions:

- Approximately 500 to 700 cubic yards (50 to 70 dump truck loads) of earth materials have been **excavated** (cut) from an existing cut bank and **placed** near the top of a slope that descends to Canyon Road, a Mendocino County road. Site slopes contain ground cracks and appear unstable.
- The earth materials have been used to form a dam that **ponds** water. The water likely percolates through the slopes that descend to Canyon Road and saturates the underlying slope materials. When soil gets over-saturated it loses cohesion and becomes too heavy to support itself. With the aid of gravity the soil will slide down the hillside.
- The eastern portion of the property appears to be slowly and actively moving. The unstable slopes descend to Canyon Road where a portion of the road appears to have been moved (offset) about 4 inches.

Risks:

The potential failure of site slopes onto Canyon Road poses a risk to the safety and welfare of persons that use the road. Slope failure will likely incur costs required to open the road and make it safe. The potential failure of slopes within the site poses a risk to the existing house and inhabitants.

Recommendations:

1) The recommendation provided in CGS (2010) should be followed.
2) The area of grading adjacent to the house should be evaluated by a licensed engineering geologist and civil engineer with regards to reconfiguring the hillslope to conditions with less adverse impacts to slope stability. This would likely require a "Slope Stability Analysis". Review and approval of the analysis should be conducted by the State or an independent third party that is selected by the State or the County of Mendocino.
3) Water should not be allowed to pond and percolate into site slopes. Water should be evenly disperse or directed to a location that will not adversely impact slope stability.
4) The eastern portion of the property should have a "Geologic Hazard Zone" (GHZ) indicated on the property deed. The purpose of the GHZ would be to identify existing or potential geological hazards and to restrict development (grading) in the interests of preventing hazards from causing harm to people or property. Normally the GHZ is shown on the deed map and included in the surveyed legal description. The GHZ stays attached to the property even if it is sold.

References:

California Geological Survey (CGS), 2010, Supplementary Engineering Geologic Inspection of Non-permitted activity 1-05NON-018 MEN, Case Number 07MEN 7166-48, 6401 Canyon Road, Willits, CA: Memorandum to William Snyder, Deputy Director, California Department of Forestry and Fire Protection by David Longstreth, 5 p., dated September 13, 2007.

original signed by
David Longstreth, CEG # 2068
Certified Engineering Geologist

DEPARTMENT OF CONSERVATION

CALIFORNIA GEOLOGICAL SURVEY

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Memorandum

To: Jeanette Pedersen
California Department of Forestry
and Fire Protection
17501 N. Highway 101
Willits, CA 95490

Date: August 11, 2011

From: David Longstreth
Department of Conservation
California Geological Survey
17501 N. Highway 101
Willits, CA 95490

Subject: Engineering Geologic Assessment of Grading Operations at 29880 and 30010 Highway 101, Willits, CA; Cal Fire LE Case # 11CAMEU004127-46

References:

California Forest Practice Rules (CFPR), 2011. Incl. the Z'Berg-Nejedly Forest Practice Act of 1973. California Department of Forestry & Fire Protection, Resource Management, Forest Practice Program, PO Box 944246, Sacramento, CA 94244-2460.

California Building Code (CBC), 2010 (IBC 2009), Appendix J. GRADING.

Kelsey, H.M.,1998, *Formation of Inner Gorges*: Catena, Vol 15, p.433-458.

Kilbourne, R.T., 1984 A, Geology and Geomorphic Features Related to Landsliding, Longvale 7.5' Quadrangle, Mendocino County, California: California Division of Mines and Geology Open File Report 84-18, scale 1:24,000.

Kilbourne, R.T., 1984 B, Geology and Geomorphic Features Related to Landsliding, Willits NW (Burbeck) 7.5' Quadrangle, Mendocino County, California: California Division of Mines and Geology Open File Report 84-19, scale 1:24,000.

Pampeyan, E.H., and others, 1981, *Preliminary Map Showing Recently Active Breaks Along the Maacama Fault Zone Between Laytonville and Hopland, Mendocino County, California*, USGS, Map MF-1217.

Reid, M.E., et al, 2003, *Debris-flow initiation from large, slow-moving landslides*: Debris-Flow Hazards Mitigation: Mechanics, Prediction, and Assessment, Rickenmann& Chen (eds).

Scullin, C.M., 1990, *Excavation and Grading Code Administration, Inspection, and Enforcement, Prentice-Hall*, Englewood Cliffs, New Jersey.

Swanson, F.J., and Swanston, D.N., 1977, *Complex mass-movement terrains in the western Cascade Range, Oregon*: Geological Society of America, Reviews in Engineering Geology, Volume III.

Aerial Photographs Inspected:

CDFI, 1947, Black and white aerial photographs, Roll 6, Frames 2, 3, nominal scale 1:20,000.

CVN, 1952, Black and white aerial photographs, Roll 9K, Frames 124, 125, nominal scale 1:20,000.

Cartwright,1963, Black and white aerial photographs, Mendocino County Flight, Roll 3, Frames 156, 157; 158; nominal scale 1:20,000

CDF ALL-UK, 1981, Black and white photographs, Flight CDF ALL-UK, Roll 26, Frames 2, 3, nominal scale 1:24,000.

WAC Inc., 1984, Black and white photographs, Flight WAC-84C, Roll 15, Frames 167, 168, nominal scale 1:12,000.

WAC Inc., 1988, Black and white photographs, flight WAC CA 88, Roll 15, Frames 94, 95; nominal scale 1:31680.

WAC Inc., 2000, Black and white photographs, Flight WAC-00-CA, Roll 2, Frames 99, 100; nominal scale 1:31,680.

Introduction:

The California Geological Survey (CGS) was requested by CALFIRE to evaluate reported grading operations conducted at 29880 and 30010 Highway 101, Willits, CA., on slopes inclined up to 80 percent and more. A July 8, 2011 site visit was attended by Rusty Boccaleoni (CDFG), Stormer Feiler (NCRWQCB), Bob Scaglione (AQMD), Jim McCleary (County of Mendocino Code Enforcement), Ray Madrigal (County of Mendocino Code Enforcement), Jeanette Pedersen (CAL FIRE), Craig Pedersen (CAL FIRE), Lou Sciocchetti (CAL FIRE), Tim Meyers (CAL FIRE), Andy Whitlock (CAL FIRE) and Dave Longstreth (CGS).

Geologic Conditions:

The subject properties consist of two adjacent parcels (29880 and 30010 Highway 101, Willits, California) both of which are on steep slopes that drain to tributaries of Outlet Creek, a 303d listed tributary to the Eel River. The slopes are underlain by Upper Cretaceous to Tertiary age Coastal Belt of the Franciscan Complex (Kilbourne, 1984 A and B, Figure 1) that is described as gray-green consolidated sandstone containing scattered interbeds of siltstone, shale, and conglomerate. Where observed bedrock generally consisted of gray brown to orange brown sandstone that appeared pervasively jointed.

Review of aerial photographs (sets 1947, 1952, 1963, 1981, 1984, 1988, 2000) suggest that the steep stream side slopes (70 to 90 percent) that flank drainages within the site area appear as debris slide slopes, a geomorphic feature characterized by an aggregate of debris slide scars left by the movement of predominantly unconsolidated rock, colluvium, and soil along relatively shallow failure planes. Additionally two deep-seated landslides interpreted by review of the historical set of aerial photographs (sets 1947 through 2000) and by hummocky topography are observed at the site. The landslides, which appear to be translational/rotational rock slides, are likely characterized by very slow progressive ground deformation on a subsurface slip plane or basal shear zone. Deep-seated landslides often toe into watercourses forming steep slopes that may be susceptible to shallow landsliding (Reid et al, 2003).

Site slopes were observed to be steep ranging from 70 to 90± percent where they toe into an unnamed watercourse that flow to Reeves Canyon. Inner gorge geomorphology was observed on the slopes that flank site drainages. Kelsey (1988) describes the formation of inner gorge geomorphology as a process where a stream down cuts through rock, resulting in an abrupt change in slope angle, with steep channel banks and upper, less steep valley slopes. In the California Coast Ranges, Kelsey (1988) describes a mechanism of inner gorge formation

controlled by tectonic uplift, climate, and underlying rock characteristics. This process occurs over a geologic time scale of thousands to hundreds of thousands of years and can be temporally and physically intermittent depending on controlling factors.

A lineament of the active Maacama fault zone is mapped as trending through the site area (Pampeyan and others, 1981, Figure 2) that parallels the northwest trending ridge system along the western margin of the site area. This suggests the bedrock in the area may be sheared and broken from fault movements. The steep slopes observed in the subject site area appear to be underlain by pervasively jointed and sheared bedrock that is inherently prone to deep-seated and shallow seated landslide processes. Human activities such as road construction and grading may adversely impact slope stability (Swanson and Swanston, 1977) on slopes such as these. Such adverse impacts can result in accelerated land movement, additional landsliding, sediment delivery, and adverse impacts to habitat and public safety.

Observations. (keyed to Figures 3, 4, 5, 6, 7).

Pad Area #1. The southern approximately 1.8 acre pad was constructed on a northeast trending spur ridge (Figures 4 and 5). Materials cut from the ridge nose were side cast on the ridge flanks. The fill is estimated to be a maximum of about 20 to 25 feet thick and it is estimated to be on the order of about 15,000 cubic yards of materials. Organic debris (for example tree stumps, brush, and logs) were observed protruding out of the fill. In many places the organic debris was observed to be in positions that appeared to be supporting the fill materials. The fills do not appear to have been founded, keyed into, or placed on firm soils or bedrock. The fills appear very loose and uncompacted. Fills are perched on 80 percent slopes that descend to watercourses that flow to Highway 101. Review of aerial photographs (sets 1947 through 2000) indicate that while roads or skid trails were constructed in the area of the pad in the 1980s, no pad area was present prior to the 2000 aerial photographs.

A house pad with what appears to be a manufactured home is located immediately below and northeast of Pad Area #1 (Figure 3). This is immediately below what is estimated to be the thickest fill slopes at the northeast end of Pad #1.

Pad Area 2. The northern 0.6± acres pad was constructed on a northeast facing slope (Figure 6). Fills estimated to range from from about 10 to 20 feet thick appear to have been side cast on the slope. It is estimated that roughly 2500 cubic yards of fill materials were generated. Organic debris (for example tree stumps, brush, and logs) was observed protruding out of the fill. In many places the organic debris was observed to be in positions that appeared to be supporting the fill materials. The fills do not appear to have been founded, keyed into, or placed on firm soils or bedrock. The fills appear very loose and uncompacted. The fills are perched on 80 percent slopes that descend to Highway 101. Review of aerial photographs (sets 1947 through 2000) indicates that a smaller pad area was constructed in this area in the 1980s and was enlarged sometime after the 2000 photographs were taken.

Road Reconstruction. An approximately 1300-foot long driveway constructed at a 30 percent gradient leads from the pad areas to Highway 101 (Figure 7). The driveway appears to have been pre-existing and recently reconstructed. The driveway contains an outside berm and appears undrained for approximately 1300 feet before reaching Highway 101.

Cutting and filling appears to have recently occurred at the top of the driveway. What appears to be approximately 300 to 400 cubic yards of side cast materials were placed onto 90 percent slopes that descend to a watercourse channel. The side cast fills extend from the driveway all the way to the channel (approximately 100 feet) and have resulted in sediment in the watercourse. The watercourse flows to an on-site domestic water supply and eventually to an approximately 42-inch diameter culvert that flows under Highway 101 (Figure 7). The culvert was observed to be about half filled with sediment at the time of the inspection.

Environmental and Public Safety Concerns.

1). Grading. It appears that the grading techniques used to construct the pad fills were conducted in a manner that is considered unstable and not safe from failure (CFPR, 2011; CBC, 2010; Scullin, 1990). As such, there appears to be a significant potential that if the fills used in the pad constructions become saturated the fill slopes will fail. This would likely impact downslope watercourses, the downslope house pad, site driveway and Highway 101. This could impact the health and well fare of inhabitants of the house immediately below Pad #1 and could result damage to utilities on the site, such as fuels or other toxic materials potentially stored on site that could potentially contaminate ground water. Saturation of the uncompacted fills could occur from irrigation of vegetation of plants on the pad and/or from winter rains.

2). Driveway Drainage. The existing reconstructed driveway appears undrained and if left in its current condition, runoff from it appears to be in a position to flow onto Highway 101. This could result in sediment deposition onto Highway 101 and could adversely impact the safety of the motorists that use the highway.

3). Highway 101 Culvert. The approximately 42-inch diameter culvert that flows under Highway 101 could become plugged if fills that have been side cast into the watercourse channel at the top of the driveway are not removed from the channel. If the culvert plugs, water will likely pond along fills used to construct Highway 101 and eventually flow across the highway. This could adversely impact stability of Highway 101 and the safety of the motorists that use it.

4). Irrigation. Irrigation of plants on the pad areas could lead to percolation of water into loose fill and bedrock exposed on the pad surface and could result in adverse impacts to slope stability of the slopes on the site.

Recommendations:

A mitigation plan shall be developed by a California Certified Engineering Geologist (CEG) and a licensed Geotechnical Engineer. The mitigation plan shall include but not be limited to:

- A CEG and Geotechnical Engineering shall evaluate the adequacy of grading techniques and the stability of on-site cuts and fill, including an evaluation of potential impacts resulting from failure of slopes to the house pad immediately below Pad #1. The evaluation shall also address potential impacts related to the reconstructed driveway, and potential impacts to downslope drainages, watercourse, and Highway 101. The mitigation plan shall include a map that identifies the locations of unstable fills and slopes and shall include a finding by the project CEG regarding the stability of existing fill slopes.
- The geotechnical engineer shall provide mitigations and designs that include remediation of unstable fills that includes but is not limited to a grading plan that outlines

corrective grading designs. The corrective grading plan and designs will likely require the removal and possible re-compaction of unstable fills and shall be designed by the geotechnical engineer in such a way to minimize potential adverse impacts to slope stability identified by the CEG.

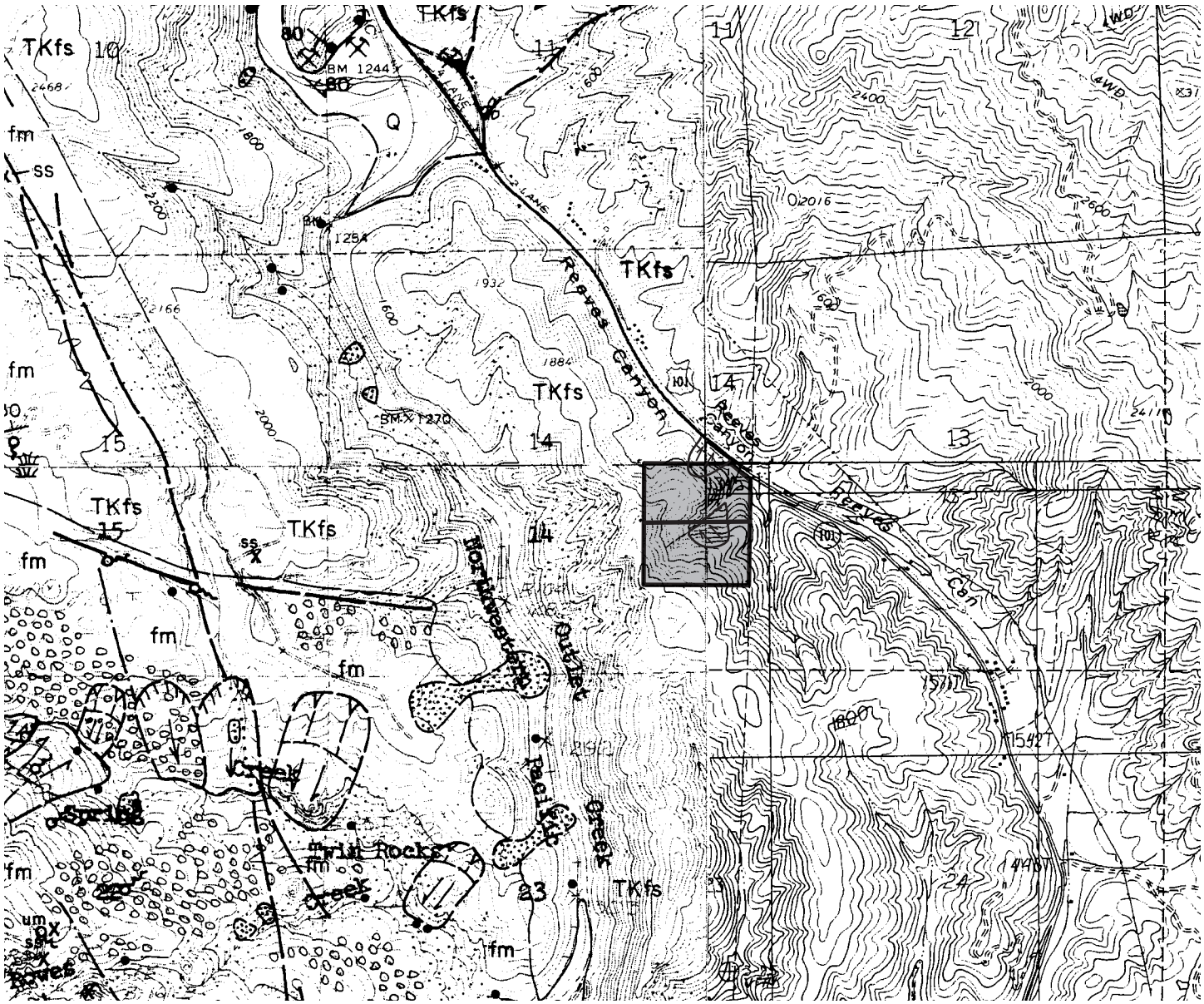
- Cal Trans shall be notified of potential impacts to Highway 101 and the 42-inch diameter culvert that runs under the highway and have the opportunity to comment or participate in any mitigations to Highway 101.
- A geotechnical engineering or CEG shall provide mitigation and design that de-waters and drains the site driveway. This can be included on the corrective grading plan that is developed for site remediation.
- A CEG shall evaluate potential impacts to slope stability resulting from irrigation of plants placed on the pad areas and the potential for percolation of water into bedrock, unstable fills, and along the bedrock/fill contact.
- The mitigation plan shall include a time frame that outlines completion of mitigations prior to commencement of the 2011 fall/winter rains and shall include a schedule of post-remediation inspections.
- CGS shall review and provide recommendations to Cal Fire regarding the approval of the mitigation plan prior to implementation.

Disclosure: This memo should in no way be considered an Engineering Geologic Report and should not be substituted in any way for such evaluations and reports recommended and requested in this memo.

original signed by
David Longstreth, CEG # 2068
Certified Engineering Geologist

Concur
08-11-11 *original signed by*
Date, Thomas E. Spittler, CEG 1078
Senior Engineering Geologist

Attachments: Figures 1, 2, 3, 4, 5, 6, and 7.



Explanation

Q	Alluvium
TKfs	Franciscan Formation, coastal belt

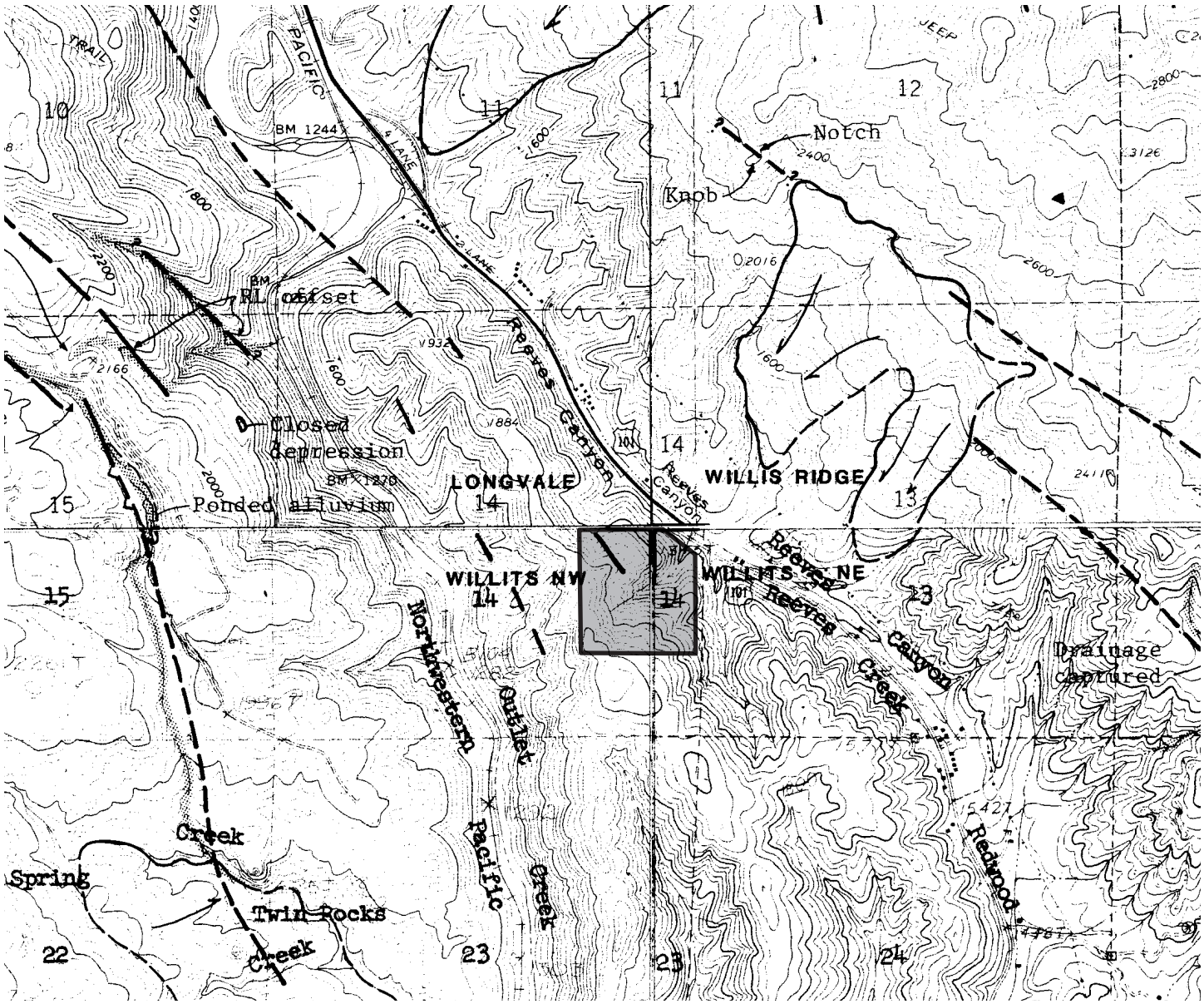
N

0 1000' 2000'

Base Map: Modified from Kilbourne, R.T., 1984 A, Geology and Geomorphic Features Related to Landsliding, Longvale 7.5' Quadrangle, Mendocino County, California: California Division of Mines and Geology Open File Report 84-18, scale 1:24,000 and Kilbourne, R.T., 1984 B, Geology and Geomorphic Features Related to Landsliding, Willits NW (Burbeck) 7.5' Quadrangle, Mendocino County, California: California Division of Mines and Geology Open File Report 84-19, scale 1:24,000.

- Geologic contact, dashed where approximately located
- Fault
- Rotational/Translational Landslide
- Active Landslide (too small to show at map scale)
- Earthflow
- Disrupted ground
- Debris Slide
- Slopes >70 percent
- Debris Flow/Torrent Track
- 75 Strike and dip of bedding
- Debris Slide Amphitheater/ Slope
- Shaded area represents estimated limits of investigation area.

Date: Aug 2011	Regional Geologic Map To Accompany Engineering Geologic Review of LE Case # 11CAMUE004127-46	Figure: 1
Scale: 1" =2000'		



Explanation

Obvious photogeologic or field evidence of recent movement.

Less obvious photogeologic or field evidence of recent movement, but very probably a fault break.

Lineament inferred to be a recent fault break based on alinement of topographic features, but evidence of recent movement is inconclusive.

Shaded area represents estimated limits of site area.

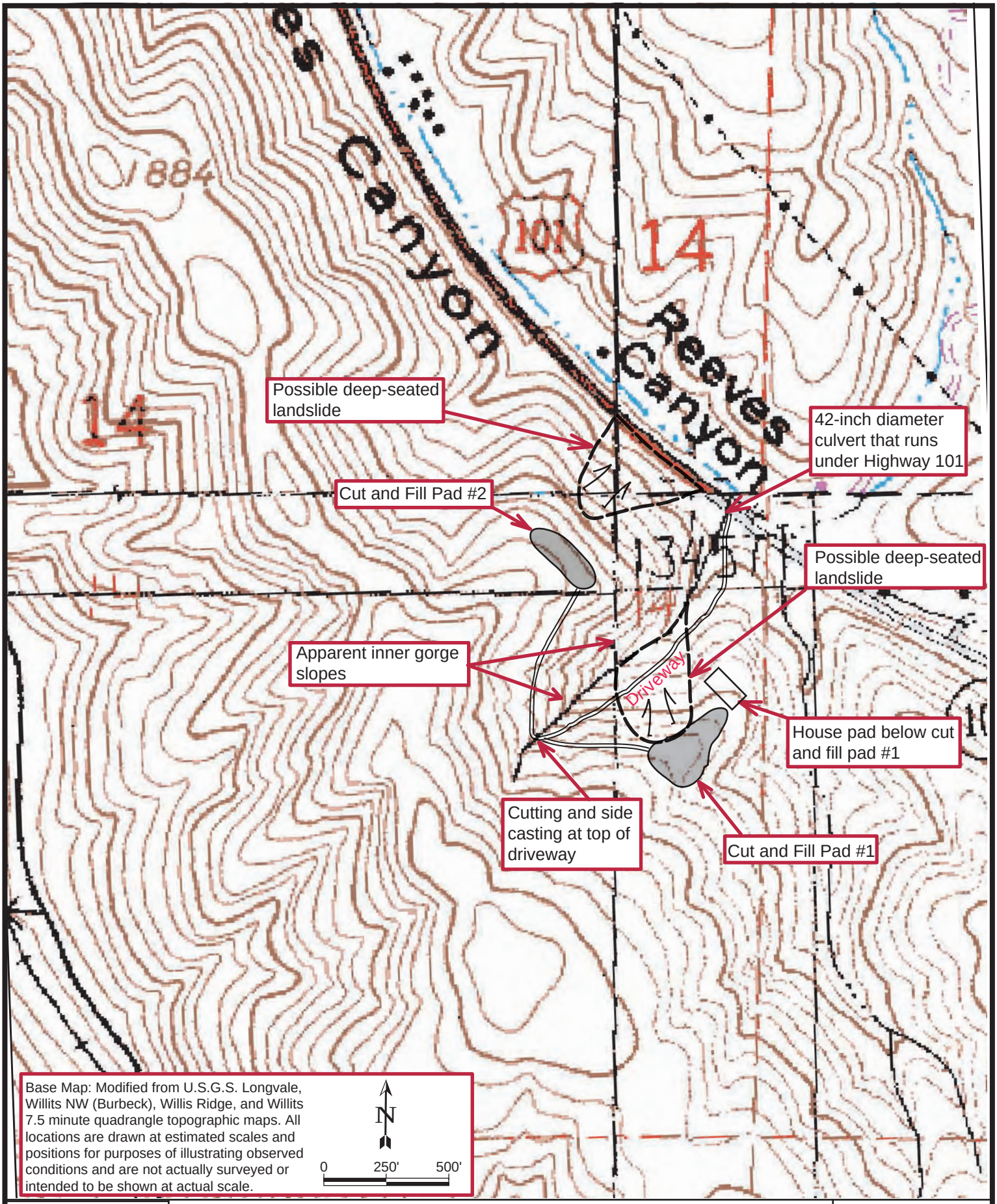
N

0 1000' 2000'

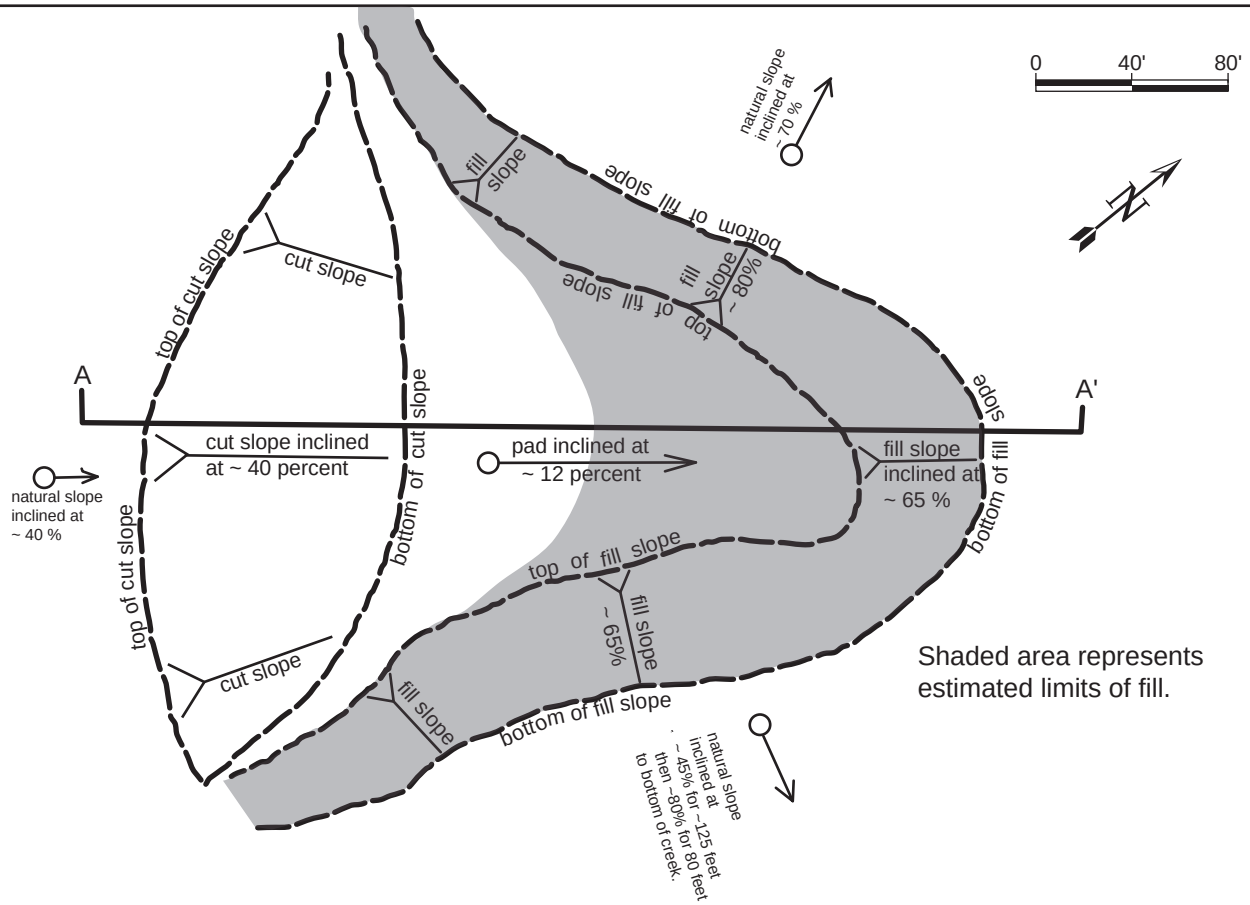
feet

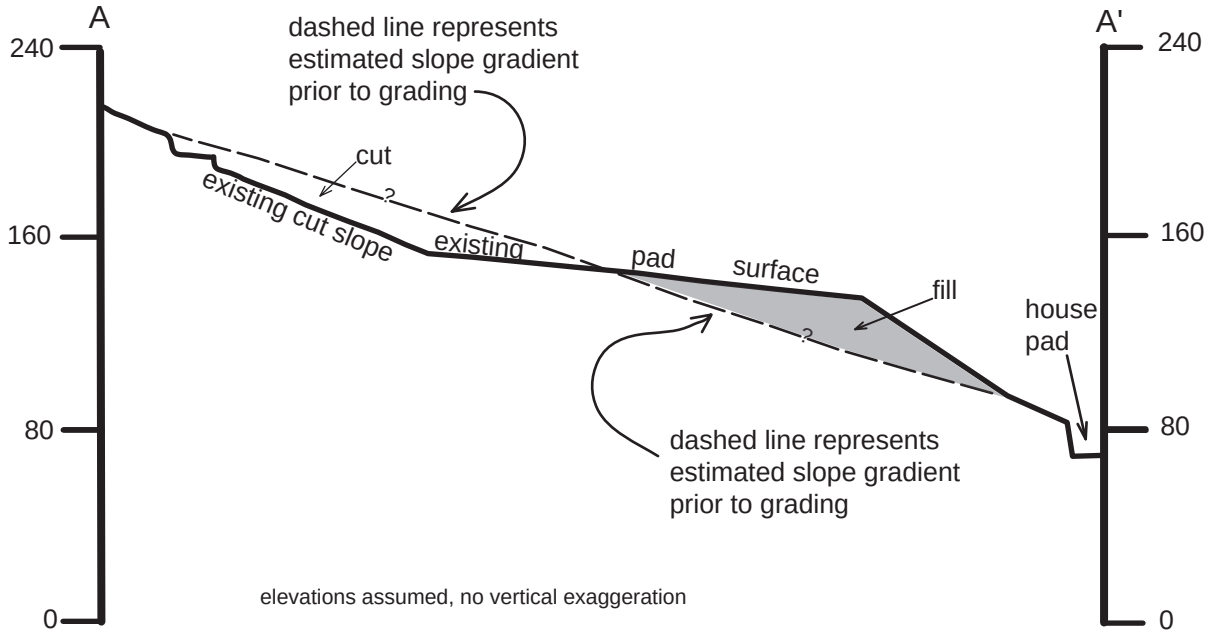
Base Map: Modified from Pampeyan and others, 1981, Preliminary Map Showing Recently Active Breaks Along the Maacama Fault Zone Between Laytonville and Hopland, Mendocino County, California, USGS, Map MF-1217.

Date: Aug 2011 Scale: 1" =2000'	Regional Geologic Map To Accompany Engineering Geologic Review of LE Case # 11CAMUE004127-46	Figure: 2



Scale: 1" = 500'	Site Map To Accompany Preliminary Engineering Geologic Review of LE Case # 11CAMUE004127-46	Figure: 3





Locations and positions shown on sketch map and sketch cross section are drawn at estimated scales, positions, and thicknesses for purposes of illustrating observed conditions and are not actually surveyed or intended to be shown at actual scale.

Scale: 1" ~ 80'	Sketch map and cross section of cut and fill pad # 1 LE Case # 11CAMUE004127-46	Figure: 4

Bottom of fill slope along pad 1.

Buried debris exposed in fill slope along pad 1

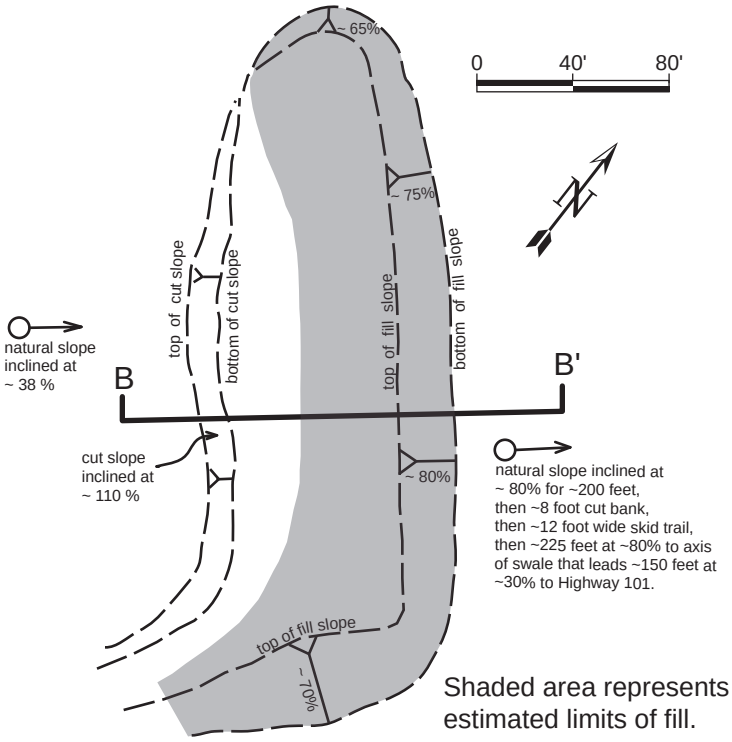
House pad immediately below pad 1.

Debris exposed in fill slope along pad 1.

Northeast panoramic view of pad 1 taken on cut slope.

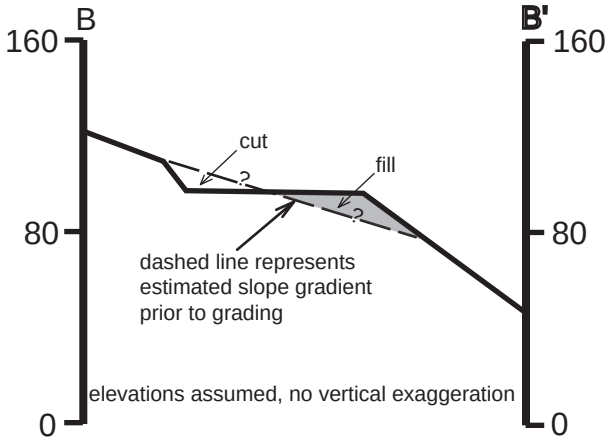
Southwest panoramic view taken from northeast margin of pad 1 looking towards cut slope.

No Scale	Photographs taken of cut and fill pad # 1 LE Case # 11CAMUE004127-46	Figure: 5



Northwest view of pad 2, cut bank excavation

Southeast view of pad 2



View southeast along pad 2 fill slope.

Facing east taken from above cut slope at pad 2.

Locations and positions shown on sketch map and sketch cross section are drawn at estimated scales, positions, and thicknesses for purposes of illustrating observed conditions and are not actually surveyed or intended to be shown at actual scale.

Scale: 1" = 80'	Sketch map and cross section of cut and fill pad # 2 LE Case # 11CAMUE004127-46	Figure: 6

Half plugged ~ 42" culvert under Highway 101

Driveway that descends to Highway 101 (in distance).

Excavation at top of driveway from which sidecast fill appear to have been generated.

View of driveway ascending from Highway 101.

Loose sidecast on ~90% slopes into creek generated from excavation at top of driveway.

Midslope portion of undrained driveway that contains an outside berm.

No Scale	Photographs taken of driveway and culvert under Highway 101, LE Case # 11CAMUE004127-46	Figure: 7

DEPARTMENT OF CONSERVATION

CALIFORNIA GEOLOGICAL SURVEY

801 K STREET • MS 13-40 • SACRAMENTO, CALIFORNIA 95814

PHONE 916 / 327-0791 • **FAX** 916 / 323-9264 • **TDD** 916 / 324-2555 • **WEB SITE** conservation.ca.gov

Memorandum

To: Jeanette Pedersen
California Department of Forestry
and Fire Protection
17501 N. Highway 101
Willits, CA 95490

Date: May 30, 2012

From: David Longstreth
Department of Conservation
California Geological Survey
17501 N. Highway 101
Willits, CA 95490

Subject: Engineering Geologic Assessment of Grading Operations at 29230 North Highway 101, Willits, CA; Cal Fire # 1-12NON-011 MEN.

References:

Durham, J., 1979, Willits 15' Quadrangle: California Department of Forestry, Title II Geologic Data Compilation Project, Unpublished, scale 1:62,500.

Pampeyan, E.H., and others, 1981, *Preliminary Map Showing Recently Active Breaks Along the Maacama Fault Zone Between Laytonville and Hopland, Mendocino County, California*, USGS, Map MF-1217.

Aerial Photographs Inspected:

Cartwright,1963, Black and white aerial photographs, Mendocino County Flight, Roll 3, Frames 157; 158; nominal scale 1:20,000

WAC Inc., 1988, Black and white photographs, flight WAC CA 88, Roll 15, Frames 93, 94; nominal scale 1:31680.

WAC Inc., 2000, Black and white photographs, Flight WAC-00-CA, Roll 2, Frames 98, 99, nominal scale 1:31,680.

Introduction:

The California Geological Survey (CGS) was requested by CALFIRE to evaluate reported grading operations conducted at 29230 Highway 101, Willits, CA, on slopes inclined up to 80 percent. A May 24, 2012 site visit was attended by Bob Scaglione (AQMD), Jeanette Pedersen (CAL FIRE), Tim Meyers (CAL FIRE), and Dave Longstreth (CGS).

Geologic Conditions:

The subject properties consist of an approximately 4 acre parcel (29230 Highway 101, Willits, California) located on steep slopes that drain to the headwaters of Lower Outlet Creek and Ryan Creek, both 303d listed tributaries to the Eel River. The slopes are underlain by Upper Cretaceous to Tertiary age Coastal Belt of the Franciscan Complex (Durham, 1979) that is

described as gray-green consolidated sandstone containing scattered interbeds of siltstone, shale, and conglomerate. Where observed bedrock generally consisted of gray brown to orange brown sandstone that appeared pervasively jointed. Site slopes were observed to be steep ranging from 60 to 80± percent where they toe into two unnamed and small (less than 10-acre) watercourses that flow to the headwaters of Lower Outlet Creek. Lineaments of the active Maacama fault zone are mapped about 3500 feet east of the site area (Pampeyan and others, 1981).

General Observations: (keyed to Figure 1).

Recent Road Construction. An approximately 670-foot long driveway constructed at a gradients that range from 15 to 25 percent gradient leads from an existing pad area at the bottom (east side) of the property to the top of the property along the western property margin (Figure 1). The driveway climbs an east facing slope making several switchback turns for a gain in elevation of about 150 feet. The road appears to be constructed using cut and fill grading techniques. Exposed cutbanks and fill slopes appeared fresh and the landowner indicated that he had conducted the grading about a month before the site visit. In general cuts and fills were observed to be on the order of about 5 feet. Taller cuts up to 11 feet in height were observed at some of the switchback turns. Organic debris (for example tree stumps, brush, and logs) was observed protruding out of the fill. In many places the organic debris was observed to be in positions that appeared to be supporting the fill materials. There were no observable indications that the fills had been founded, keyed into, or placed on firm soils or bedrock. At the surface the fills appear loose and uncompacted.

Specific Observations: (keyed to Figures 1, 2, and 3)

CGS-1 Much of the fills along the recently graded driveway are placed on 50 percent slopes that descend approximately 50 feet to a small (drainage area of less than 10-acre) tributary to Lower Outlet Creek that runs along the southern portion of the subject site. Because the fills do not appear to be properly placed (for example containing organic debris and apparently not keyed or compacted) there appears to be a moderate risk of sediment to the tributary should the fills become saturated and move downslope.

CGS -2. A drop inlet culvert that is covered by a metal grate drains the small tributary that trends though the southern portion of the site (described above) under Highway 101. The outlet of the culvert was not discovered during the site visit; however it appears that it likely drains onto a grass covered flat that is the drainage divide between Lower Outlet Creek and Ryan Creek. It appears that the flat area is capable of filtering sediment and thereby reducing the risk of significant sediment delivery to Lower Outlet Creek and/or Ryan Creek. Because the culvert is covered the condition of the inlet was not observed and a determination regarding the likelihood of culvert plugging could not be made.

CGS-3. The recently graded driveway ascends to the upper portions of the parcel. A pad area was not constructed at the top of the property at time of the site visit. What appears to be fills on the order of 3 to 5 feet thick were observed to be placed at the top of the property where the road terminates on 60 percent slopes. The slopes descend approximately 25 feet to an adjacent property north of the subject site. The slopes continue to descend on the adjacent property for about 100 feet to what appears to be a small (less than 10-acre drainage area) tributary to Lower Outlet Creek. The fill was observed to contain logs and organic debris and

display no indications they were founded, keyed into, or placed on firm soils or bedrock. The fills appear loose and uncompacted. If the fills become saturated and move in a downslope direction there appears to be a low to moderate risk of sediment moving onto the adjacent property. While a dwelling was observed on the adjacent property, it was not in a position to be directly impacted from the fills placed during the recent road construction. As such, potential impacts to public safety appear low.

CGS-4. Fills observed to be about 3 to 5 feet thick are stock piled on what appears to be an existing and apparently stable skid trail. The skid trail is situated on 65 percent slopes that descend approximately 70 feet to Highway 101. The fills do not appear to have been founded, keyed into, or placed on firm soils or bedrock. The fills appear loose and uncompacted. There appears to be a moderate risk of minor amounts of sediment moving onto the highway should the fills become saturated and move in a downslope direction. Because it appears that the shoulder of the highway might contain the minor amounts of fills that could move on the highway, it appears the potential impact to public safety is low.

General Recommendations:

- An erosion control plan should be developed by a California Certified Engineering Geologist (CEG) or a licensed Professional Engineer (PE) experienced in hillside grading. The erosion control plan should provide mitigation and design that de-waters and drains the recently constructed driveway. The erosion control plan should include a time frame that outlines completion of mitigations prior to commencement of the 2012 fall/winter rains. The erosion control plan should include but not be limited to recommendations included below under Specific Recommendations.
- The recommendations provided in this memo should be considered in addition to requirements and recommendations made by other agencies including the County of Mendocino Department of Planning and Building.

Specific Recommendations:

- CGS-1. Evaluate and mitigate the potential for sediment delivery to the small watercourse that runs through the southern portion of the site. This may necessitate removing and properly re-compacting existing fills.
- CGS-2. Evaluate the potential for culvert plugging and provide mitigations as needed. Cal Trans should be notified of potential impacts to the drop inlet culvert that runs under Highway 101.
- CGS-3. Evaluate the adequacy of grading techniques and the stability of on-site fills that could possibly fail and move onto the adjacent property north of the subject site. The erosion control plan should provide mitigations to stabilize such fills.
- CGS-4. Evaluate the adequacy of grading techniques and the stability of stock piled fills placed on an existing skid trail that could possibly fail and move onto Highway 101. The erosion control plan should provide mitigations to stabilize such fills. Cal Trans should be notified of the potential conditions.

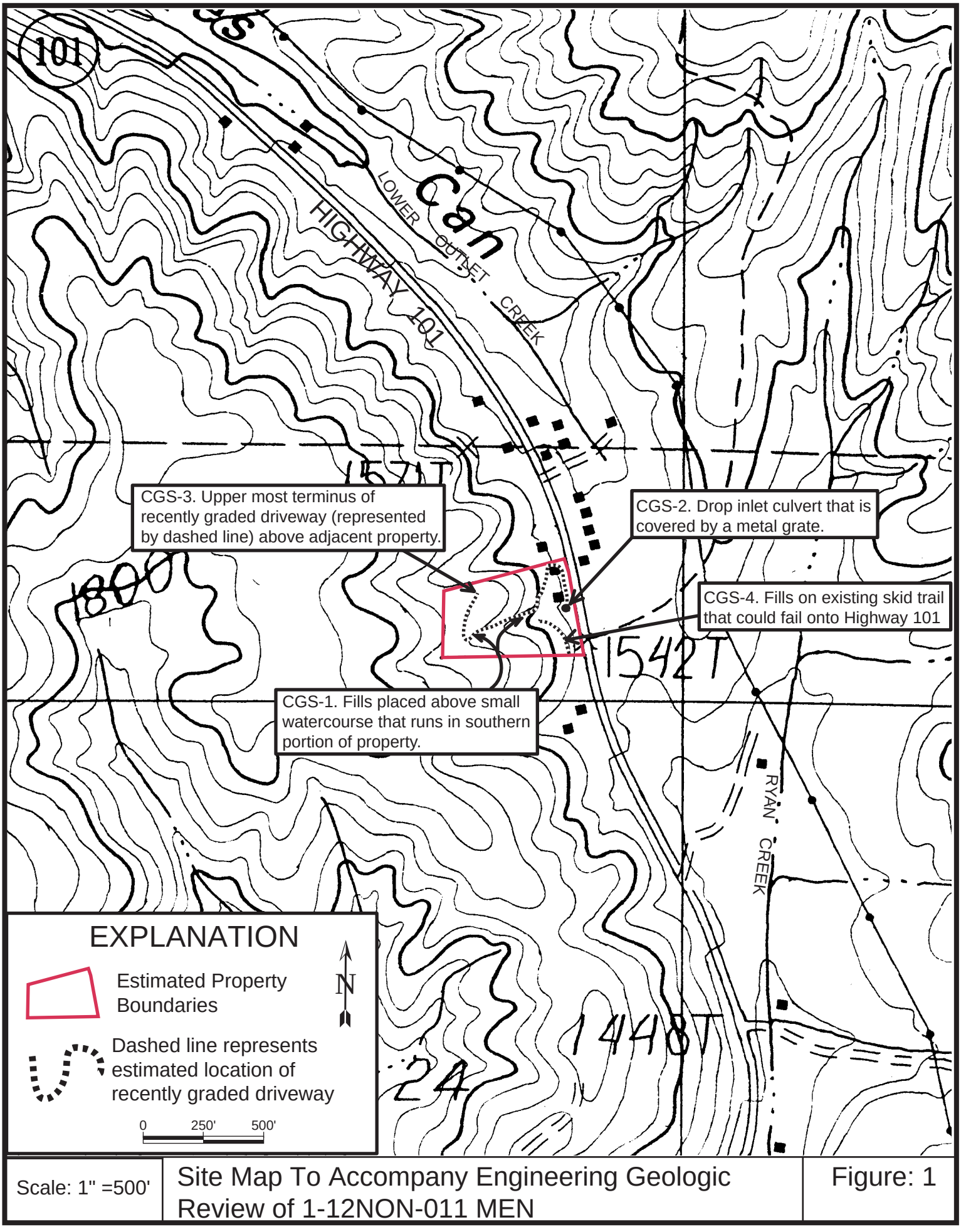
Disclosure: This memo has been provided to CALFIRE in order to assist them in determining the issues that should be addressed under their purview. It should in no way be considered an

Engineering Geologic Report and should not be substituted in any way for such evaluations and reports recommended and requested in this memo.

original signed by
David Longstreth, CEG # 2068
Certified Engineering Geologist

Concur
05/30/2012 *original signed by*
Date, Gerald J. Marshall, CEG # 1909
Senior Engineering Geologist

Attachments: Figures 1, 2, and 3.



Scale: 1" =500'	Site Map To Accompany Engineering Geologic Review of 1-12NON-011 MEN	Figure: 1

Map Point CGS-1.

Fills placed over small watercourse that trends through southern portion of subject site.

Map Point CGS-2.

Drop inlet culvert with metal grate.

	Photographs To Accompany Engineering Geologic Review of 1-12NON-011 MEN	Figure: 2

Map Point CGS-3.

Fills placed over slopes that descend to adjacent property north of subject site.

Map Point CGS-4.

Fills placed on skid trail that is located on slopes that descend to Highway 101.

	Photographs To Accompany Engineering Geologic Review of 1-12NON-011 MEN	Figure: 3

DEPARTMENT OF CONSERVATION

CALIFORNIA GEOLOGICAL SURVEY

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Memorandum

To: Jeanette Pedersen
California Department of Forestry
and Fire Protection
17501 N. Highway 101
Willits, CA 95490

From: David Longstreth
Department of Conservation
California Geological Survey
17501 N. Highway 101
Willits, CA 95490

Date: August 23, 2012

Subject: Engineering Geologic Assessment of Grading Operations at 70100 Arnett Drive, Leggett, CA; Cal Fire Case # 12CAMEU 005419-35.

References:

Davenport, C.W., 1983, Geology and Geomorphic Features Related to Landsliding, Noble Butte 7.5' Quadrangle, Mendocino County, California: California Division of Mines and Geology Open File Report 83-41 S.F., scale 1:24,000.

Aerial Photographs Reviewed:

CVN, 1952, Black and white aerial photographs, Roll 12K, Frames 171, 172; nominal scale 1:20,000.

Cartwright,1963, Black and white aerial photographs, Mendocino County Flight, Roll 9, Frames 49; 50; nominal scale 1:20,000

CDF ALL-UK,1981, Black and white aerial photographs, Mendocino County Flight, Roll 10, Frames 21, 22, nominal scale 1:20,000

WAC Inc., 1988, Black and white photographs, flight WAC CA 88, Roll 21, Frames 9, 10; nominal scale 1:31680.

WAC Inc., 2000, Black and white photographs, Flight WAC-00-CA, Roll 10, Frames 180, 181; nominal scale 1:31,680.

Introduction:

On August 16, 2012 the California Geological Survey (CGS) was requested by Jeanette Pedersen of CALFIRE to evaluate reported grading operations conducted at 70100 Arnett Drive, Leggett, CA. An August 21, 2012 site visit was attended by Chris Brown (AQMD), Jeanette Pedersen (CAL FIRE), Craig Pedersen (CAL FIRE), Craig Dudley (CAL FIRE), and Dave Longstreth (CGS).

Geologic Conditions:

The subject property consist of an approximately 120-acre parcel (70100 Arnett Drive, Leggett, California) located on steep slopes that drain to the Rock Creek and other unnamed tributaries to the Eel River. This review is limited to a roughly eight acre portion of the property located on relatively flat ground and will hence be referred to as the study area. The study area is underlain by Upper Cretaceous to Tertiary age Coastal Belt of the Franciscan Complex and locally mantled by Quaternary river terrace deposits (Davenport, 1983, Figure 1). The Coastal Belt Franciscan Complex is described as consisting of gray-green consolidated sandstone containing scattered interbeds of siltstone, shale, and conglomerate that is generally broken and sheared. Quaternary river terrace deposits locally overly the Franciscan Complex on elevated alluvial cut terrace platforms deposited during higher stands of the Eel River (Davenport, 1983). These deposits consist of orange brown silts and sands containing well-rounded pebbles and cobbles. Bedrock was not observed in the study area during the August 21, 2012 site visit.

An approximately 12-acre watercourse is located adjacent to and north of the study area that flows to a lower elevation alluvial cut terrace within a portion of the Standish Hickey State Recreational Area where a caretaker's house and a few outbuildings are located. The watercourse appears to disperse on the flat lower terrace and no channel was observed connecting to the Eel River. Davenport (1983) does not map any geomorphic landslide features in the study area, nor were any observed during the site visit.

Observations: (keyed to Figure 1)

Cleared Area. An approximately 4-acre area of the study area appears to have been cleared of vegetation (brush, conifer, and hardwoods) and bladed. Isolated piles of debris and soil were observed scattered along the margins of the cleared area (estimated limits shown on Figure 1). The apparent minor blading does not to appear to have adversely impacted large-scale slope stability in the study area. Some debris (on the order of 50 cubic yards) was observed to be placed above the 60 to 70 percent slopes that descend approximately 30 to 50 feet to a watercourse located north of the study area (shown on Figure 1). The debris appears loose and to contain organic debris. There appears to be a moderate risk of sediment delivery to the watercourse should portions of the debris become saturated and move in a down slope direction. It appears that sediment could flow onto the State Recreational Area but would likely come to rest on the relatively flat terrace. There appears to be a low likelihood of adverse impacts to existing buildings or improvements. Because the amount of potential sediment delivery to the watercourse appears relatively small and the watercourse appears to disperse on the lower terrace platform located in the State Recreational Area, the likelihood of adverse impacts to Highway 101 and/or sediment delivery to the Eel River similarly appears low.

Recommendations:

Cleared Area. The debris placed along the north side of the cleared area above the slopes that descend to the watercourse north of and below the cleared area should be removed such that the potential for the debris to delivery sediment to the watercourse is reduced. The debris should be placed and stabilized in a location where the threat of sediment delivery or adverse impacts to slope stability and/or down slope properties is minimized. A professional

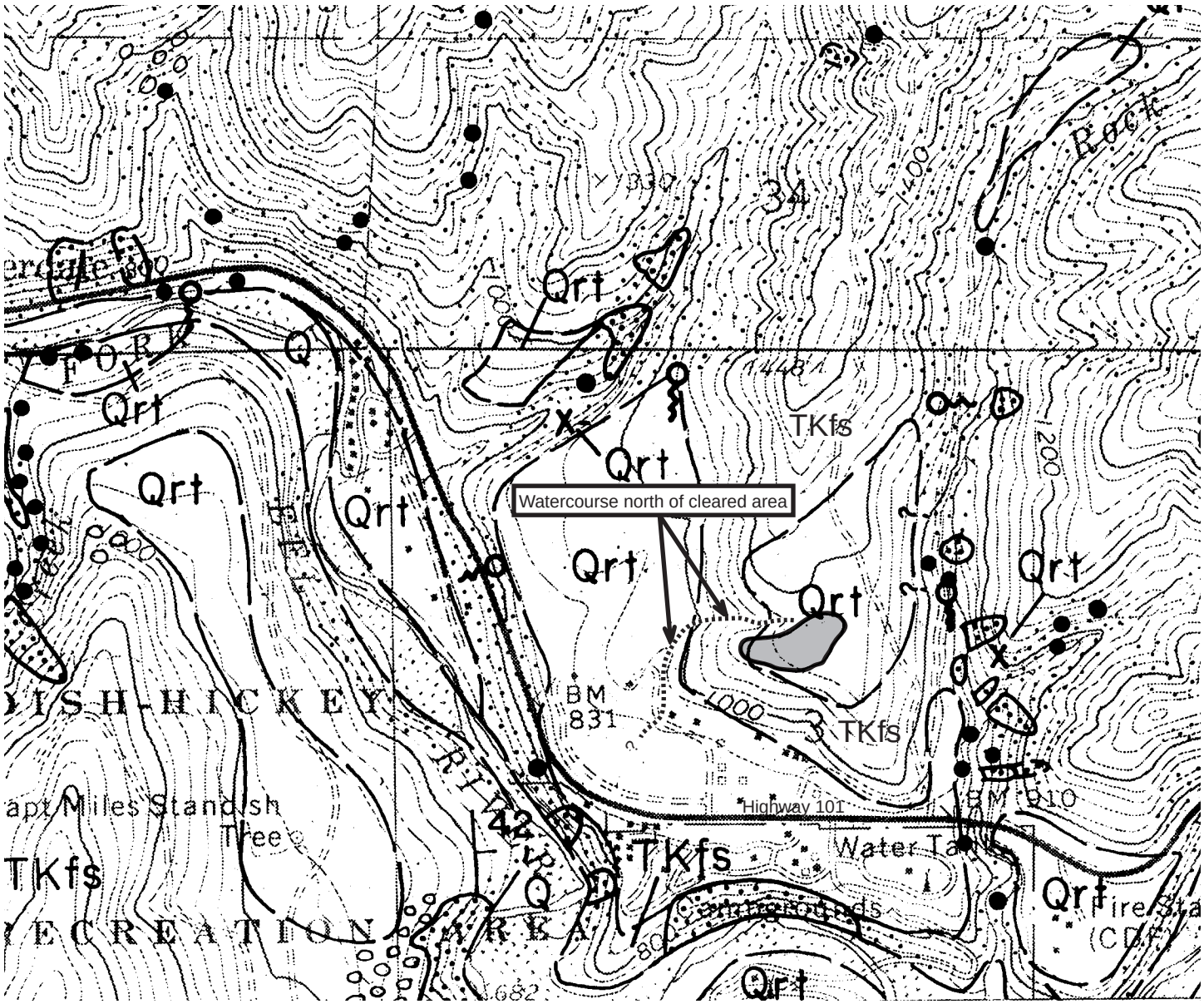
experienced in this type of work (for example a Registered Professional Forester, RPF or a Professional Geologist, PG) should be consulted to design and supervise the recommended work.

Disclosure: This memo has been provided to CALFIRE in order to assist them in determining the geologic issues that should be addressed under their purview. It should in no way be considered a Geologic Investigation and should not be substituted in any way for such evaluations and reports. The recommendations provided in this memo should be considered in addition to requirements and recommendations made by other agencies.

original signed by
David Longstreth, CEG # 2068
Certified Engineering Geologist

Concur
08/23/2012 *original signed by*
Date, Gerald J. Marshall, CEG # 1909
Senior Engineering Geologist

Attachments: Figure 1.



Explanation

Q	Alluvium
Qrt	River Terrace Deposits
TKfs	Franciscan Formation, coastal belt

N

0 500' 1000'

- Geologic contact, dashed where approximately located
- Rotational/Translational Landslide
- Earthflow
- Debris Slide
- Debris Flow/Torrent Track
- Debris Slide Amphitheater/ Slope
- Inner gorge
- Active Landslide (too small to show at map scale)
- Disrupted ground
- Slopes >70 percent
- 75 Strike and dip of bedding
- Shaded area represents estimated limits of cleared area.

Base Map: Modified from Davenport, C.W., 1983, Geology and Geomorphic Features Related to Landsliding, Noble Butte 7.5' Quadrangle, Mendocino County, California: California Division of Mines and Geology Open File Report 83-41 S.F., scale 1:24,000.

Date: Aug 2012 Scale: 1" =1000'	Regional Geologic Map To Accompany Engineering Geologic Review of Case Number 12CAMEU 005419-35	Figure: 1

DEPARTMENT OF FORESTRY AND FIRE PROTECTION
P.O. Box 944246
SACRAMENTO, CA 94244-2460
(916) 217-8647
Website: www.fire.ca.gov

August 31, 2023

Department of Cannabis Control
c/o Angela McIntire-Abbott
2920 Kilgore Road
Rancho Cordova, CA 95670

RE: Notice of Preparation for the Department of Cannabis Control Draft Environmental Impact Report for Licensing of Commercial Cannabis Cultivation in Mendocino County.

Dear Ms. McIntire-Abbott:

The California Department of Forestry and Fire Protection (CAL FIRE) appreciates the opportunity to comment on the Notice of Preparation for the Department of Cannabis Control (DCC) Draft Environmental Impact Report (DEIR) to support licensing of commercial cannabis cultivation in Mendocino County. CAL FIRE is tasked with providing fire protection and fire prevention services and enforcing the State's forest and fire laws, including without limitation the Z'berg-Nejedly Forest Practice Act. (Pub. Resources Code § 714.) In addition, the Office of State Fire Marshal, a program within CAL FIRE, is responsible for adopting and enforcing building standards related to fire prevention and other standards as provided for in the Health and Safety Code. The following comments are submitted jointly on behalf of all CAL FIRE programs and reflect CAL FIRE's combined experience in fire protection, fire prevention, and resource management.

Concerns Related to Indoor Cultivation of Cannabis

Indoor cultivation of cannabis presents numerous challenges for fire prevention and protection. Indoor cultivation using artificial light often requires electricity in excess of what the structure was originally intended to handle, leading to the potential for electrical fire. In a similar vein, faulty wiring or electrical equipment also have the potential to cause electrical fires. The production of cannabis extracts often involves chemicals and processes that pose a significant threat of explosion or ignition. These fires threaten human life and property and cause other potentially significant impacts to the human environment. More numerous fires tax the fire protection capabilities of CAL FIRE and other fire departments, which may lead to increased response times and/or costs of fire protection, a potentially significant impact per item XIV(a) of the CEQA Checklist. The DEIR should consider what mitigations are available to reduce the threat of fire or explosion at indoor cultivation operations. The licensing program could also include a requirement that all such indoor cultivation operations be in compliance with California's fire, electrical, and building regulations.

Concerns Related to the Outdoor Cultivation of Cannabis

Outdoor cultivation of cannabis presents further challenges to CAL FIRE's fire prevention and protection missions, as well as for its enforcement of the Forest Practice Act. Fire prevention and protection concerns include:

1. Over 90% of all wildfires occurring within CAL FIRE's jurisdiction are caused by humans, and the presence of humans greatly increases the risk of wildfire. Many outdoor grow operations occur in wildlands that are otherwise sparsely populated, and the increase in human activity increases the risk of wildfire. The DEIR should consider the potentially significant impacts arising from increased potential for wildfires, which threaten life and property, habitat for animals, water and air quality, and other significant environmental values, and should analyze mitigations to those impacts, including restrictions on siting and increased fire prevention measures for cultivation sites.

2. Whereas unpopulated timberland or other lands present a relatively low occurrence for fire protection, cannabis cultivation introduces people, structures, and valuable property into these lands, leading to increased need for fire protection from CAL FIRE and other agencies. The DEIR should consider the impacts to fire protection services from outdoor cultivation and propose mitigations for such impacts pursuant to item VIII(h) of the CEQA Checklist.

3. Outdoor cultivation is often conducted on land that was principally used for timber harvesting and is serviced only by roads intended for logging. These roads often do not meet the standards of inhabited areas for ingress for firefighting apparatus and egress for evacuating civilians. The DEIR should consider these potential impacts and mitigations, including requiring that all outdoor cultivation sites be serviced by roads meeting the ingress and egress standards for residential dwellings, regardless of whether a residential dwelling is present on the property.

4. Outdoor cultivation sites often have travel trailers and other non-permanent structures that are not required to maintain defensible space in accordance with the regulations adopted by the State Board of Forestry and Fire Protection pursuant to section 4290 of the Public Resources Code and the requirements imposed by the Legislature in section 4291. However, these trailers have similar potential for the ignition of fires as other structures. Without defensible space, a fire originating in a travel trailer or other non-permanent structure has a greater potential to spread to the wildlands surrounding the structure. DCC should consider requiring defensible space around outdoor cultivation sites and related structures that would otherwise not be subject to those requirements but present similar ignition potential.

5. Outdoor cultivation often involves the use of generators, pumps, and other gasoline operated equipment subject to the fire prevention requirements in section 4427 of the Public Resources Code, including that the ground be cleared of flammable vegetation around the equipment and that fire suppression tools be maintained near the equipment to allow personnel to suppress fires in their incipient phase.

6. Outdoor cultivation requires significant amounts of water, generally during a cannabis growing season that largely coincides with fire season. Over-drafting of water from watercourses could potentially limit water availability for fire suppression.

CAL FIRE's concerns regarding outdoor cultivation's impacts to timberland resources regulated by CAL FIRE pursuant to the Forest Practice Act include:

1. The conversion of timberland, as defined in section 4526 of the Public Resources Code, to a use other than growing timber requires a timberland conversion permit (or its equivalent) to be approved by CAL FIRE prior to conversion. (Pub. Resources Code § 4621.) However, CAL FIRE has observed that many outdoor cultivation sites were the result of unlawful and unpermitted conversion of timberlands. This failure to secure the required permits (and undergo their associated CEQA review) not only undermines CAL FIRE's protection of timber resources but also the ability of other agencies to protect resources for which they are the trustee (e.g., tribal representatives as to archaeological resources, the California Department of Fish and Wildlife as to fish and wildlife, the North Coast Regional Water Quality Control Board and State Water Resources Control Board as to water quality and allocation, etc.). The illegal conversion of timberland for cannabis cultivation has had immeasurable negative impacts to California's environment and Mendocino County in particular. The DEIR should analyze the potential significance of conversion of forestland to non-forest use per item II(d) of the CEQA Checklist, including environmental impacts of illegally converted cultivation sites, and consider mitigations including without limitation requiring that all cultivation sites located on timberlands demonstrate compliance with the Forest Practice Act.

2. Again, outdoor cultivation sites are often located on lands that have historically been used for timber harvesting and that are serviced only by logging roads that are intended and engineered only for limited, intermittent use. Outdoor cannabis cultivation often involves trucking in water and other supplies, increased motor traffic from workers and visitors, and other uses that tax logging roads not intended for that use. In addition, while the Forest Practice Act and Rules limit use of roads during wet conditions, there are no such restrictions on other uses of those roads during wet conditions. This expanded use and use during wet conditions often damages or destroys the road's erosion and sediment control facilities designed to limit water quality impacts during rain events, potentially increasing sediment delivery from the roads to watercourses. The DEIR should consider this potentially significant impact and analyze mitigations including standards for the construction and maintenance of roads servicing outdoor cultivation sites.

3. The conversion of timberlands to other uses often results in conflicts with timber harvesting on the neighboring timberlands, including but not limited to noise complaints, traffic, road maintenance disputes, aesthetics concerns, trespass, etc. These land use conflicts may represent a significant impact under item II(c) of the CEQA Checklist.

4. Growing trees are a valuable carbon sink that sequester carbon and thereby reduce atmospheric carbon that causes global climate change. The conversion of timberlands to cannabis cultivation removes those trees' ability to sequester carbon while resulting in an increase in atmospheric carbon due to the decay or open burning of the removed trees

and the cannabis vegetation that has no value (i.e., plants stems, leaves, root systems, and male cannabis plants). Additionally, the conversion of timberland to cannabis cultivation results in increased emissions from equipment and vehicular traffic related to the cultivation. Given this disparity between the carbon sequestering timber uses and the carbon intensive cannabis cultivation, the DEIR should consider the greenhouse gas impacts related to outdoor cannabis cultivation on timberland.

CAL FIRE appreciates the opportunity to comment on the Notice of Preparation for the Department of Cannabis Control Draft Environmental Impact Report for Licensing of Commercial Cannabis Cultivation in Mendocino County. As development of the draft document proceeds, please consider CAL FIRE a resource for forest and fire-related questions and concerns. I can be reached by phone at 916-217-8647 or by email to eric.huff@fire.ca.gov should you have questions or concerns about this correspondence.

Sincerely,

DocuSigned by:
Eric Huff
7200ED9A9ECC40A...

ERIC K. HUFF, RPF No. 2544
Assistant Deputy Director
Forest Practice

Cc. Edith Hannigan, Executive Officer, California Board of Forestry and Fire Protection
J. Keith Gilless, Chair, California Board of Forestry and Fire Protection

State of California - Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
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601 Locust Street
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***GAVIN NEWSOM**., Governor*
***CHARLTON H. BONHAM,** Director*

August 31, 2023

Angela McIntire-Abbott
Department of Cannabis Control
2920 Kilgore Road
Rancho Cordova, CA 95670
publiccomment@cannabis.ca.gov

SUBJECT: NOTICE OF PREPARATION OF A DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE LICENSING OF COMMERCIAL CANNABIS CULTIVATION IN MENDOCINO COUNTY

Dear Angela McIntire-Abbott:

The California Department of Fish and Wildlife (Department) has reviewed the Notice of Preparation (NOP) of a Draft Environmental Impact Report (DEIR) for the Licensing of Commercial Cannabis Cultivation in Mendocino County (Project; State Clearinghouse Number 2023080049). The NOP was prepared pursuant to the California Environmental Quality Act (CEQA). The Department received the NOP from the Department of Cannabis Control (DCC) on August 2, 2023.

The Department has jurisdiction over the conservation, protection and management of fish, wildlife, native plants and their habitat. The Department is California's Trustee Agency for fish and wildlife resources and holds those resources in trust by statute for all the people of the State. (Fish and Game Code, §§ 711.7, subd. (a) & 1802; Pub. Resources Code, § 21070; CEQA Guidelines § 15386, subd. (a).) The Department, in its trustee capacity, has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species. (Id., § 1802.) Similarly, for purposes of CEQA, the Department is charged by law to provide, as available, biological expertise during public agency environmental review efforts, focusing specifically on projects and related activities that have the potential to adversely affect fish and wildlife resources.

The Department is also submitting comments as a Responsible Agency under CEQA. (Pub. Resources Code, § 21069; CEQA Guidelines, § 15381.) The Department expects that it may need to exercise regulatory authority as provided by the Fish and Game Code. As proposed, for example, the Project may be subject to the Department's lake and streambed alteration regulatory authority. (Fish and Game Code, § 1600 et seq.) Likewise, to the extent implementation of the Project as proposed may result in "take" as defined by State law of any species protected under the California Endangered Species Act (CESA) (Fish and Game Code, § 2050 et seq.), the project proponent may seek related take authorization as provided by the Fish and Game Code.

Thank you for the opportunity to provide comments and recommendations regarding those activities involved in the Project that may affect California fish and wildlife. Likewise, we appreciate the opportunity to provide comments regarding those aspects of the Project the Department, by law, may be required to carry out or approve through the exercise of its own regulatory authority under Fish and Game Code.

The Department continues to support efforts to effectively regulate cannabis cultivation, and to address its numerous and substantial environmental impacts. The Department believes that greater regulatory oversight and enforcement by Lead Agencies, including Mendocino County, can help minimize the environmental impacts of cannabis cultivation.

Environmental Baseline

As outlined in CEQA section 15002(a), one basic purpose of CEQA is to inform governmental decision makers and the public about the potential, significant environmental effects of *proposed* activities. Unlike a typical CEQA review process, preparation and review of the DEIR for licensing of cannabis cultivation in Mendocino County will primarily address environmental impacts "after-the-fact."

Proposition 64 asked the State to create strict environmental regulations and ensure full compliance with environmental laws (section 2 (F)). In addition, each site must comply with CEQA and conduct environmental review of proposed projects. The County of Mendocino (County) adopted a Mitigated Negative Declaration under CEQA for its Cannabis Cultivation Regulations[1] (ordinance) in April 2017. Many cannabis cultivation sites that submitted an application pursuant to the 2017 regulation have been allowed to continue to operate prior to the issuance of a County permit.

The NOP states that DCC has issued approximately 608 provisional commercial cannabis cultivation licenses in Mendocino County. Most of these provisionally-licensed sites submitted an application for a local permit under the County's 2017 ordinance. Applications submitted under Phase 1 of the County's 2017 ordinance, which make up the majority of sites with provisional DCC licenses, were required to demonstrate that cannabis cultivation existed prior to January 1, 2016. The County's Mitigated Negative Declaration defined the baseline as August 26, 2016, the date on which the County submitted requests for early consultation to Responsible and Trustee agencies and other interested parties. The Department supports the use of an August 26, 2016 date for determining baseline conditions for the DEIR. This is the appropriate CEQA baseline for cannabis projects with cultivation that existed prior to adoption of the County ordinance, or with existing applications in the County's cannabis regulatory program, and environmental analysis in the DEIR should reflect this date. (**Recommendation #1**)

[1] Mendocino County Mitigated Negative Declaration and Mitigation Monitoring and Reporting Program for the Medical Cannabis Cultivation Regulation, adopted April 2017, State Clearinghouse number 2016112028.

In May 2023, Mendocino County adopted amendments to the ordinance, and adopted an addendum to the 2017 Mitigated Negative Declaration relating to the County's cannabis regulation and permitting processes. The NOP states the DEIR prepared by DCC will "programmatically evaluate the environmental impacts of the DCC's annual licensing of cannabis cultivation operations in the county as well as the environmental impacts of future licensed commercial cannabis operations." To ensure the public and other agencies have the opportunity to comment effectively on the Project, the DEIR should explain, in detail, how the County and DCC processes, licenses and permits will be implemented in relationship to each other, and how they will interact with other existing permits and processes. (**Recommendation #2**)

Cumulative Impacts

Cumulative impacts must be addressed pursuant to CEQA section 15130. The NOP states the DEIR will address the cumulative environmental consequences of the proposed Project in combination with other closely related past, present, and reasonably foreseeable future projects in the area.

CEQA section 15355 defines cumulative impacts as "two or more individual effects which, when considered together, are considerable…" and may include "the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects." This section continues, "Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time."

The Department is concerned about cumulative impacts not only as they relate to licensed cannabis cultivation and associated development, but also unpermitted cannabis cultivation, and cannabis cultivation sites that have been abandoned without remediation. For example, Mendocino County has denied a number of local permit applications. Many cannabis cultivation properties in the permitting process were allowed to continue operations for years prior to permit denial. The DEIR should address unpermitted cultivation and abandoned sites, as well as cannabis cultivation sites that will ultimately receive an annual license with DCC.

Department staff have observed that cannabis cultivation properties in the County permitting process have often expanded development after the baseline date, but prior to review and permit issuance. This expansion of development includes measurable impacts which have not yet been analyzed. These impacts include tree removal, grading, development of infrastructure (e.g. roads and hoop houses), additional water diversion infrastructure (including surface diversions and groundwater wells), and other development related to expansion of cultivation and/or residential development on parcels with cannabis cultivation. Impacts from these past and present projects can be observed and measured using existing resources, and should be documented, quantified, analyzed and disclosed in the DEIR.

The Department recommends the DEIR consider all cannabis cultivation sites when determining cumulative impacts of its licensing program in Mendocino County, including quantifying impacts that have occurred since the environmental baseline date. (**Recommendation #3**)

Environmental Impacts

Documented environmental impacts of cannabis cultivation include habitat fragmentation, habitat loss through land clearing and conversion, reduction in instream flow, and delivery of sediment, nutrients, petroleum products, and pesticides to streams (Carah et al. 2015). Increased development in rural or previously undeveloped areas are a major concern to the Department and include road building, grading, pond construction, stream crossing construction, increased use of poorly maintained road systems, and hydrologic modification including rerouting of streams and interception of groundwater through poorly constructed road systems.

Wetlands may be directly impacted and permanently lost through development and conversion, and can be directly or indirectly impacted by hydrologic modification (CDFW 2014). State policy (Executive Order W-59-93) and Mendocino County policy (General Plan Resource Management Element Policy RM-29) each seek to achieve no net loss of wetlands. The DEIR should include measures to avoid or fully mitigate impacts to wetlands. (**Recommendation #4**)

Additional impacts Department staff have documented include degraded water quality, degraded habitat due to inappropriate location of development, development within riparian buffers, loss and degradation of wetland habitat, wildlife entanglement and mortality due to cultivation site hazards (e.g., plastic mesh), wildlife entrapment, fish passage barriers due to improperly designed water diversions and stream crossings, altered natural photoperiods from light pollution, and introduction of non-native species (fish and plants) resulting in predation of native species and degraded habitat quality.

Many of these impacts are unique to cannabis cultivation. Strategies to minimize and mitigate potentially significant environmental impacts should be fully considered and incorporated in the DEIR. These environmental impacts should be analyzed both individually and on a cumulative basis on a parcel, stream, watershed, and regional scale. (**Recommendation #5**)

<u>Water Use and Availability</u>

California has a Mediterranean climate, where most of the state's precipitation falls from October to May (CDFG 2003), not during the primary cannabis summer growing season. Due to the lack of summer rainfall and the absence of snow, rivers and streams have receding flow from May until September. Water use peaks in the heat of the

summer at the same time instream flow is at its lowest, creating a conflict between water demand and water availability for fish and wildlife resources. The Department is concerned there is not adequate flow in most streams to meet the water demand for cannabis cultivation at its current levels, as well as the domestic water use for dwellings and other residential and commercial uses associated with or developed to facilitate cannabis cultivation and processing. Based on numerous field observations and ongoing research, the Department believes the overuse of surface water diversions for cannabis cultivation has and will continue to have a significant impact on aquatic resources.

The potentially significant impacts from the substantial alteration, and diversion and use of water from streams and rivers must be disclosed and analyzed in the DEIR. These environmental impacts should be analyzed both individually and on a cumulative basis on a parcel, stream, watershed, and regional scale. (**Recommendation #6**)

In addition, the Department has observed the construction and use of large ponds as a water storage method has increased in the County. In many cases, Mendocino County has allowed the construction of new ponds, which often involve substantial grading and fill, under a ministerial grading and/or pond exemption permit with no environmental review. These ponds may pose risks to water quality and sensitive habitats if they are designed and constructed without proper engineering. The Department has observed ponds built in inappropriate locations, and failed ponds that have delivered sediment to nearby streams. In addition, these ponds often provide breeding habitat for non-native, invasive species such as American bullfrog (*Lithobates catesbianus*), a species that preys upon native frogs such as the northern red-legged frog (*Rana aurora)* and foothill yellow-legged frog (*Rana boylii*), both California Species of Special Concern. The DEIR should provide a mechanism to regulate the development of ponds as part of cannabis cultivation permitting, including a requirement for engineered designs where appropriate, and invasive species management plans for all ponds. Ponds may be subject to the notification requirement in Fish and Game Code section 1602 et seq. if they are filled from, or outlet to, a stream or wetland.
(**Recommendation #7**)

Major watersheds, such as the Eel River, Mattole River, and Russian River watersheds, overlap with adjacent counties. Potential and existing impacts to those watersheds are not contained by county lines. Impacts should, therefore, be assessed at the watershed level, and should not be limited to impacts contained within County boundaries. The Department recommends the scope of the DEIR include impacts to these watersheds from cannabis cultivation located in Mendocino County. (**Recommendation #8**).

<u>Direct impacts to streams, riparian areas, wetlands</u>

Many areas where cannabis cultivation may be permitted include agricultural and other areas within the 100-year floodplain. Floodplains are an important physical and

biological component of riverine ecosystems. All rivers flood, and flooding is an expected and recurring event in natural river systems. Development in flood-prone areas disconnects rivers from their natural floodplains and displaces, fragments, and degrades important riparian habitat. Development in floodplains often eliminates benefits of natural flooding regimes such as deposition of river silt on valley floor soils and recharging of wetlands. In addition, braided channel structure, off-channel fish habitat, and backwaters are eliminated, resulting in higher velocity flows. These changes lower habitat suitability for salmonids, which need low-flow refugia to escape flood flows. Structures in flood plains are vulnerable to erosion and flood damage. Once structures are built and threatened by river flooding, property owners often seek to armor river banks or build or raise levees to prevent future property damage. Thus, not only does development displace riparian and floodplain habitat when it is built, it often results in further habitat and floodplain loss through additional development to protect structures.

Development and habitat conversion in floodplains results in degradation of riverine and riparian habitats, and negatively impacts the fish and wildlife species that depend on them. The Department recommends that placement of new permanent structures for cannabis cultivation within the 100-year floodplain of any stream or river is prohibited. (**Recommendation #9**)

Impacts of Night Lighting on Wildlife

Cannabis cultivation often includes the use of artificial lighting in hoophouses, and so-called “mixed-light” techniques to increase yields. The adverse ecological effects of artificial night lighting on terrestrial, aquatic, and marine resources such as fish, birds, mammals, and plants are well documented (Johnson and Klemens 2005, Longcore and Rich 2016, Rich and Longcore 2006). Some of these effects include altered migration patterns and reproductive and development rates, changes in singing behavior in bird species (Miller 2006), changes in foraging behavior and predator-prey interactions, altered natural community assemblages, phototaxis (attraction and movement towards light), disorientation, entrapment, and temporary blindness (Longcore and Rich 2004, Longcore and Rich 2016).

The Department has determined that light pollution disrupts the abilities of night-foraging birds (CDFG 2007). Artificial lighting impacts bat roosts, and Johnston et al. (2004) recommend that artificial lighting be directed away from bat roosts or possibly shaded by trees. Research on the effects of artificial lighting on salmonid populations indicate that increased light intensity appears to slow or stop out-migrating juvenile salmon and affects feeding patterns. Juvenile salmonids in the presence of increased artificial night lighting may be more vulnerable to predation (McDonald 1960, Patten 1971, Ginetz and Larkin 1976, Tabor et al. 2004). Because cannabis cultivation sites are commonly located in remote forested areas that would otherwise not be affected by night light pollution, and because these forested areas contain habitat for many

organisms that are negatively impacted by light pollution, cultivation using artificial light on a landscape scale could have a significant impact on wildlife.

The Department recommends that if lighting is used for cultivation within structures, light should not be visible from outside the structure. DCC should ensure this condition is enforceable, and actively monitored for compliance. The use of automatic greenhouse covers should be mandated or encouraged to reduce the incidence of light pollution (**Recommendation #10**).

Impacts of Noise on Wildlife

Diesel and gasoline-powered electric generators are a common fixture of indoor and outdoor cannabis cultivation sites. Electric generators can produce considerable air and noise pollution. The effects of noise pollution on wildlife include disrupting communication between individuals, affecting predator-prey relationships and foraging efficiency, and habitat selection and bird nesting density (Barber et al. 2009; Francis and Barber 2013).

On a watershed scale, the chronic noise pollution from numerous cannabis cultivation site generators has the potential to result in substantial habitat loss or degradation to a number of wildlife species. Generator-produced noise pollution can be especially harmful to night-foraging animals such as owls and bats, which hunt for prey primarily though hearing. The State- and federally-threatened northern spotted owl (*Strix occidentalis*), for instance, occurs in forested coastal Mendocino County and is vulnerable to nighttime generator noise impacts.

Impacts to bats from noise are another specific concern. Populations of many bat species across North America and globally are declining. Approximately fifteen percent of the global bat fauna are listed as threatened by the International Union for Conservation of Nature (IUCN). However, a greater number of species (about 18%) are listed by the IUCN as “data deficient,” meaning there is a lack of studies that can be used to support assessments of conservation status (Voigt and Kingston 2016). This decline has numerous causes, but habitat loss and degradation are principal contributors. Bats have been shown to avoid areas with chronic noise (Schaub et al. 2008) and the foraging success of certain bat species is reduced by chronic noise (Siemers and Schuab 2011).

In conjunction with the other habitat fragmentation, degradation, and disturbance-related impacts of outdoor cannabis cultivation already mentioned, both night light pollution and chronic generator-induced noise impacts may contribute to landscape-scale wildlife habitat declines and may have individual and cumulative significant impacts.

Based upon the information above, the Department recommends the DEIR include an analysis of potential night light pollution and chronic noise exposure impacts to wildlife, and effective avoidance, minimization and/or mitigation strategies. (**Recommendation #11**)

Impacts to Listed Species

Mendocino County is known to support several species listed or candidate under the California Endangered Species Act (CESA, Fish and Game Code section 2050 et seq.). Specifically, Coho Salmon (*Oncorhynchus kisutch*), Summer Steelhead (*O. Mykiss),* and Northern Spotted Owl (*Strix occidentalis caurina*) are present in areas where cannabis cultivation occurs. Cannabis cultivation activities detailed above have the potential to cause "take" of and impacts to these listed species. Take of species of plants or animals listed as endangered or threatened under the California Endangered Species Act (CESA) is unlawful unless authorized by the Department with an Incidental Take Permit. The DEIR should state whether the Project could result in any incidental take of any CESA-listed species. DCC should adequately analyze potential impacts and include avoidance, minimization and mitigation measures to avoid or mitigate impacts in the DEIR. (**Recommendation #12**) For Coho Salmon and Summer Steelhead, cumulative impacts from surface water diversion are a particular concern.

General Comments

Effectiveness of Mitigation Measures

Mendocino County's Cannabis Regulations have been in effect since April 2017. The Department is concerned the County's existing regulatory framework has not been effective in avoiding, minimizing and/or mitigating the environmental impacts of cannabis cultivation. Pursuant to CEQA section 15002, the DEIR must disclose and evaluate all of the project's potentially significant impacts; identify ways to avoid or significantly reduce environmental damage; propose, as appropriate, feasible and effective mitigations for those impacts; and disclose reasons for approving the proposed project if significant environmental impacts will occur. In addition, pursuant to CEQA section 15126.4(a)(2), mitigation measures must be fully enforceable through permit conditions, agreements, or other legally binding instruments.

The DEIR should include an analysis of the effectiveness of mitigation measures under the current program in avoiding, minimizing or reducing the environmental impacts of cannabis cultivation sites, particularly if the same or similar mitigation measures are proposed for use in the DCC's licensing program **(Recommendation #13)**.

Fish and Game Code

Several Fish and Game Code sections apply to activities associated with cannabis cultivation. Fish and Game Code section 1602 et seq. requires notification for diversions of water from a surface water source, or of water hydrologically connected to a surface water source (e.g. offset wells), as well as for physical changes to the bed, channel or bank of any river, stream, or lake. State licensing through DCC requires that all cultivators obtain either a Lake or Streambed Alteration Agreement (LSAA) pursuant to FGC section 1602, or verification from the Department stating that an LSAA is not required.

Department staff have documented increased observations of unpermitted non-native aquatic species introductions to ponds used for water storage and water diversion associated with cannabis cultivation. Fish and Game Code section 6400 requires first submitting for inspection and securing a stocking permit from the Department before planting fish. The Department recommends the Project prohibit the introduction of non-native species to ponds, and DCC should address the potential environmental impacts from existing non-native species in the DEIR. (**Recommendation #14)**

DCC staff and/or license applicants should consult with the Department to ensure compliance with all FGC sections. Examples of other applicable FGC sections include but are not limited to section 2050 et seq. CESA section 5650 (prohibits water pollution), section 5652 (prohibits refuse disposal in or near streams), and section 5937 (requires sufficient water bypass and fish passage, relating to dams).

Summary of Recommendations

In summary, the Department provides the following recommendations:

1. The Department supports the use of an August 26, 2016 date for determining baseline conditions for the DEIR. This is the appropriate CEQA baseline for cannabis projects with cultivation that existed prior to adoption of the County ordinance, or with existing applications in the County's cannabis regulatory program, and environmental analysis in the DEIR should reflect this date.

2. To ensure the public and other agencies have the opportunity to comment effectively on the Project, the DEIR should explain, in detail, how the County and DCC processes, licenses and permits will be implemented in relationship to each other, and how they will interact with other existing permits and processes..

3. The Department recommends the DEIR consider all cannabis cultivation sites when determining cumulative impacts of its licensing program in Mendocino

County, including quantifying impacts that have occurred since the environmental baseline date.

4. The DEIR should include measures to avoid or fully mitigate impacts to wetlands.

5. Strategies to minimize and mitigate potentially significant environmental impacts should be fully considered and incorporated in the DEIR. These environmental impacts should be analyzed both individually and on a cumulative basis on a parcel, stream, watershed, and regional scale

6. The potentially significant impacts from the substantial alteration, and diversion and use of water from streams and rivers must be disclosed and analyzed in the DEIR. These environmental impacts should be analyzed both individually and on a cumulative basis on a parcel, stream, watershed, and regional scale.

7. The DEIR should provide a mechanism to regulate the development of ponds as part of cannabis cultivation permitting, including a requirement for engineered designs where appropriate, and invasive species management plans for all ponds. Ponds may be subject to the notification requirement in Fish and Game Code section 1602 et seq. if they are filled from, or outlet to a stream or wetland.

8. The Department recommends the scope of the DEIR include impacts to these watersheds from cannabis cultivation located in Mendocino County.

9. The Department recommends that placement of new permanent structures for cannabis cultivation within the 100-year floodplain of any stream or river is prohibited.

10. The Department recommends that if lighting is used for cultivation within structures, light should not be visible from outside the structure. DCC should ensure this condition is enforceable, and actively monitored for compliance. The use of automatic greenhouse covers should be mandated or encouraged to reduce the incidence of light pollution

11. The Department recommends the DEIR include an analysis of potential night light pollution and chronic noise exposure impacts to wildlife, and effective avoidance, minimization and/or mitigation strategies.

12. The DEIR should state whether the Project could result in incidental take of any CESA-listed species. DCC should adequately analyze potential impacts and include avoidance, minimization and mitigation measures to avoid take and mitigate all direct and indirect impacts in the DEIR.

13. The DEIR should include an analysis of the effectiveness of mitigation measures under the current program in avoiding, minimizing or reducing the environmental impacts of cannabis cultivation sites, particularly if the same or similar mitigation measures are proposed for use in the DCC's licensing program.

14. The Department recommends the Project prohibit the introduction of non-native species to ponds, and DCC should address the potential environmental impacts from existing non-native species in the DEIR.

We appreciate the opportunity to comment on the Project and look forward to working with the DCC to support the regulation of commercial cannabis cultivation while protecting the fish and wildlife resources held in trust for all Californians. The Department is available for consultation during all stages of the CEQA process, to share information related to fish and wildlife resources, and discuss potential impacts and proposed mitigation. If you have any questions or would like to request a meeting please contact Senior Environmental Scientist (Supervisor) Angela Liebenberg at cegareferrals@wildlife.ca.gov.

Sincerely,

DocuSigned by:
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B5D12ECE94324AF...

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Habitat Conservation Project Branch CEQA Project Coordinator

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Cc: Marty Clein; hashchakj@mendocinocounty.org; Michael Katz
Subject: Mendocino County CEQA EIR scoping public Comments

Follow Up Flag: Follow up
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8/31/2023

Dear DCC, Ascent, and all interested parties,

As Mendocino County farmers who have had an approved County cannabis cultivation permit (not an embossed receipt) since 2017, including being inspected again and renewed recently. As well as having had a State Provisional license since they became available in 2018. We feel compelled to comment on the scoping process for the new pathway to CEQA compliance.

We read the notice of preparation and we understand the focus as it was stated for the scoping process, ""The EIR will programmatically evaluate the environmental impacts of the DCC's annual licensing of commercial cannabis cultivation operations in the county as well as the environmental impacts of future licensed commercial cannabis cultivation operations."

We listened to the State scoping meeting and we have read the letter to the Mendocino BOS from Director Nicole Elliot of the DCC regarding the CEQA process. We appreciate the State stepping into partnership with our County geared at transitioning the Phase One cohort from Provisional to Annual licenses.

The money being spent on this EIR came from the State's LJAGP grant awarded to our County. The scope of that LJAGP was to assist with transitioning existing cultivators to State annual licenses. We feel strongly that should still be the main focus.

We are not land use experts, although we have sure learned a whole lot over the past 7+ years of working thorough the dual County and State regulatory framework. Our 10,000 sq foot cultivation is located in the hills of Covelo, Round Valley which is zoned as Rangeland. We have been part of the group who has been pushing the County for an EIR all along. And we are glad to have one being prepared now to clarify the parameters for the public.

But we want to be sure that the scope of the State CEQA EIR delineates the difference between Phase One farms, who all had to prove prior cultivation to even qualify for Phase One. To repeat for emphasis, Phase One farms had to prove prior cultivation to even qualify for Phase One, is a very important point!

We understand that farms that are looking to expand, and especially new cultivation sites being considered in Phase Three, will likely have to do additional environmental reports to guarantee that they fall within the scope of the EIR. While we are not against limited expansion, we have no plans personally to expand.

We strongly believe Phase One farms should be exempt, or grandfathered in to CEQA approval via the EIR. These farms have already completed the required environmental assessments, have already been inspected by the various County and State agencies, and in many cases, are already approved, or in a queue with their documents ready and waiting to be approved.

Using multiple pathways for CEQA will insure the highest number of farms can achieve their State annual license. Finding a way to accept Ap G documents will help, the DCC process those in the program who have already completed the checklist,

Using the MND is imperative! It was written to cover upward of 10,000 small farms and we have less that 1000 small farms using approximately 200 acres of land right now in the Mendocino as part of Phase One of our ordinance. These numbers are notable, especially when cannabis cultivation is compared to other agricultural crops in our County, such as the 16,000+ acres of grape vines.

We heard at the scoping meeting, and as stated in the quote from the DCC above, the EIR will take into account all cannabis activities preset and future. We believe the proof of prior cultivation, and therefore, every single farm in the Phase One cohort, with an emphasis on those who have not expanded since the ordinance passed or who have done so with proper approvals, are covered under the prior MND.

As you know, 10,000 sq ft and under, is considered by the State as a small farm, and anything above it is classified as a medium or large farm in the California cannabis sector. Our farm, like many in Mendocino County, is also completely outdoor. We are 3rd party certified by SUN+EARTH, a non-profit organization out of Oregon, whose standards are like saying we are "beyond organic."

Mendocino County has a rich history of sustainable agriculture as a center of the back-to-the-land movement. We were the were the 1st County in the USA to vote for non-gmo standards regarding commercial crops. We are the environmentalists! Many, if not all of the Phase One farms that are active in the local cannabis program are longtime stewards of the land. These types of documented best management practices should also count toward exemptions from CEQA. The requirements have already been fulfilled.

We are members of and appreciate the Mendocino Cannabis Alliance (MCA) and urge you to take into account the valuable insights that the many professionals, stakeholders and advocates within this organization bring to the table.

Thank you for allowing public input and considering our comments.

Laura & Marty Clein
Martyjuana™
Mendocino County

August 30, 2023

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RE Public Comment - Draft EIP Licensing of Commercial Cannabis Cultivation in Mendocino County Project

To whom it may concern:

BACKGROUND

I purchased my property, an undeveloped 130 acres in the hills west of Hopland, March 2014. I was the second purchaser of an approximate 3000 acre 16 parcel development. Only a few parcels per a year were sold. I believe all parcels were sold by 2018. Zoning is Agriculture / grazing rangeland, primarily an oak forest with madrone, manzanita, a few fir and very little brush. Terrain is steep to very steep with very little open useable space. I believe all these parcels were in the Williamson Act (sheep and cattle grazing?). I built my 3700 sf retirement home beginning in 2019. I am the only resident in the development. Until recently there were 11 cannabis properties and 5 others: 2 recreational; 2 Williamson Act grazing; and mine, residence with Williamson Act use.

Parcel access is by crossing two private road easements at the end of county Feliz Creek Road then by a 5 mile long dead end private road belonging to the 16 parcels; all behind a locked gate. The road was very good from 2014 through the fall of 2018. Per our Mendocino County 2013 Recorded Road Agreement, which all parcel purchasers received in the property disclosures, this road is described as "approximately 15' wide, rough grade gravel". In 2014, CalFire required that turnouts be installed every 300' where there were blind curves. This work was completed in 2014.

All parcels except one is off-grid; otherwise, there is no electric or gas service here. Water is by private wells and/or trucked in.

This entire area was largely pristine and quiet/uneventful until 2018 then ramping up in 2019 and more so by early 2020.

My Opinions

1. Mendocino County should have never allowed cannabis activities here:
    a. Private gravel road not intended for such use
    b. Should businesses be intending to profit from the use of a private road?
    c. Cannabis businesses are not conducive to this area
2. These cannabis operations:
    a. obviously did not have a business plan
    b. and the vested property owners (not always the operator) did not read and understand the Recorded Road Agreement (in any case, however, the property owner is accountable to the terms of this agreement)

Starting in 2020 the troubles really began:

- Some cannabis properties where the private road passes through the property are required to make changes to the private road in order to receive their required cannabis permits. The cannabis folk feel all parcels should all pay for this work. This is wrong!
- Starting in the fall of 2020, at first slowly and unsuspecting, a hostile takeover of the Road Associations by the cannabis operators began. This was not obvious until Nov./Dec. 2021.
- In the spring of 2021, all but one cannabis parcel refused to pay for road damages (heavy use, many water trucks, etc) beyond "normal maintenance" as prescribed by the Recorded Road Agreement.
- This one operator noted above, did not pay for damages after all and since then has joined the hostile takeover of the Road Association.
- All were slow to almost no pay in the past for road maintenance
- Then the private road serving the 16 parcels was widened June 29 - July 7, 2023, to 20' – 30', perhaps even up to 40' and much of the gravel has been removed (this winter will show how much). Widening is an "improvement" and not allowed by the Recorded Road Agreement. This work was done without any notice whatsoever to me. Coincidentally this work started and ended the very same days I was out of the area in Sonoma County.
- And it looks like some cannabis permit work was done on the road at this time as well – adding costs to all parcels
- Furthermore, now the lack of gravel on the road is causing dust storms without even being driven on. This is constant. The wind is strong and blows nearly all the time. So many loads of soil blowing away! And this winter much more will wash away. Lack of maintenance since the hostile takeover already caused a lot of ruts and soil washouts during the storms of 2021/2022 and again 2022/2023!
- One cannabis operator (not a property owner) acquired an additional "partner" in the fall of 2020 and new additional properties. These properties are below this development and are the initial private road access easements. I was told in 2022, that the application of "Dust-Off" is now "mandatory" for these easements. Per our attorney (this issue was first addressed in 2017), Dust-Off is also an improvement and not allowed. Since there is no formal road agreement, California Civil Code Section 845, applies.

PROBABLE ENVIRONMENTAL EFFECTS

Busy businesses; **huge increase in vehicle and people traffic**; non-residents and employees. In contrast, I live here and only drive down and back once a week at the very most. And recreational property owners only come up once in a great while.

Aesthetics

- Private roads / dust / and destruction; non-resident seasonal and some full-time employees
- Green houses dot what was once pristine oak forest
- The smell of cannabis sickens me

Agriculture and Forestry Resources

- Zoned for, and more conducive for grazing / all parcels were in the Williamson Act; but no longer

Air Quality

- The smell of cannabis sickens me
- Huge amounts of dust released into the atmosphere due to increased traffic; where in the past, dust was nearly none pre-2019/2020; now everything on my property is covered in dust, inside and out. I have a good amount of packed rock on my driveway, so it's not my dust
- Now with gravel removed from the road, the constant wind here is creating very large dust storms
- Private gravel roads were not intended for this kind of abuse

Biological Resources

- Excessive water use, overstressed wells; then requires many water trucks to bring water; I was told in 2021/2022 that as many as 15 trucks/day were required just for one operation (exaggerated rumor? I don't know but I did see and hear a lot of trucks coming and going)

Energy

- All off-grid operations; requires generators running for grow lights and pumping water

Geology and Soils

- Huge soils loss from abuse of private roads

Greenhouse Gas Emissions

- All off-grid operations; requires generators running for: grow lights and pumping water; I am not aware of any solar installations for these operations but I do hear the generators running.
- Increased traffic cars, trucks, and rtv's both on and off road

Hazards and Hazardous Materials

- Increased traffic on narrow private roads
- Increased traffic on a narrow county paved road, too!

Hydrology and Water Quality

Over-pumping wells dry up neighboring wells
All run off from these 16 parcels go straight down to Feliz Creek to the north

Land Use and Planning

- Horrendous use of what was a pristine beautiful mountain / total lack of planning by both the county and cannabis businesses (same on the ridge across from me on McNab… pretty ugly.)

Noise

- Traffic and generators

Population and Housing

- Owners and employees do not reside here; i.e., only strangers and commuters come and go
- Employees, many who don't speak English get easily lost up here; one drove her car off road down my property and got stuck late at night
- How is it that these operations can have "temporary" housing for employees? Again this development is behind a locked gate and **supposed to be private with access only for property owners and guests**.

Public Services

- The county road coming in (narrow Feliz Creek Rd) is not built for this much traffic either and takes a beating

Transportation – see public services

Utilities and Service Systems / there are no services here and I don't need them

Wildfire

- With increased people, especially many who are not vested here brings increased potential for fire. This area looks long overdue for a control burn thus it is high risk for wild fires. There have been at least three fires in the area since about 2019… one across on the other ridge; one below me in the creek area; and one very near me up on the ridge.

Just a thought… could it be that this ruckus since 2020/2021, is about obtaining final permitting? A rush to finish their permits?

I don't think these businesses should be profiting or intending to profit from the excessive use of a private road.

Minimally this is bad manners. And finally this is really bad business.

Thank you for your time. Please feel free to call me if there are any questions.

Coleen Browder
707-542-5211

From: 4garynjudy@comcast.net
Sent: Thursday, August 31, 2023 9:25 PM
To: Public Comment@Cannabis
Cc: 4kirwin2@comcast.net
Subject: ENVIRONMENTAL IMPACT REPORT FOR THE LICENSING OF COMMERCIAL CANNABIS CULTIVATION IN MENDOCINO COUNTY PROJECT

Follow Up Flag: Follow up
Flag Status: Flagged

Department of Cannabis Control

Attention: Angela McIntire-Abbott

It is my understanding that you are involved with the preparation of an Environmental Impact Report for the Licensing of Commercial Cannabis Cultivation in Mendocino County.

We have lived in Redwood Valley for over thirty years and now have many concerns about the numerous cannabis permits in our area. We are concerned about aesthetics, air quality and water as well as crime (not an environmental effect) which all affect our quality of life and property values. We have loved living near vineyards, but cannabis is a completely different kind of neighbor. Whatever you can do through your EIR to minimize the negative effects will be greatly appreciated.

R Gary & Judith K Maddox

From: cynthia grant <cmackws@pacific.net>
Sent: Wednesday, August 30, 2023 3:49 PM
To: Public Comment@Cannabis
Subject: FW: EIR for the Licensing of Commercial Cannabis Cultivation in Mendocino County

Follow Up Flag: Follow up
Flag Status: Flagged

Department of Cannabis Control (DCC)

Attention: Angela McIntire-Abbott

Dept of Cannabis Control (DCC)

As a longtime resident and small business owner in Mendocino County

(specifically) Redwood Valley, I am writing to you regarding a possible Environmental Impact Report for the permitting of Commercial Cannabis Cultivation in our immediate residential area.

The immediate area in question is largely zoned Residential and is made up of 70 % single family residences.

There are many aspects to consider and while the term “Environmental” brings to mind hazardous materials such as pesticides, herbicides.

I would like to point out a much more dangerous aspect and that is the “Changing “of this neighborhood into an area of violent crime.

In a 2016 article printed in ‘Psychology Today it is noted that “cannabis use is associated with 7-fold greater odds for subsequent commission of violent crimes.”

There are many articles documenting crime rates rising drastically in areas of California where commercial cannabis is permitted.

People with antisocial personality traits and those with tendencies toward lawlessness may be the type of individuals inclined to use and grow cannabis.

I believe that Mendocino County government thinks that issuing permits to help regulate and control the Cannabis Growers in our area, will bring much needed revenue.
They are mistaken to think that they will accomplish this. The typical cannabis grower is not a “Law Abiding Citizen” per experts, and they will not be “regulated’ as the County hopes for.
Eighty percent of their product – whether they have a legal permitted grow or not – Is sold on the Black Market.
I don’t need to tell you what Black Market activity does to a community.
The law-abiding citizens, who report their income and pay taxes, will be driven out of their neighborhoods by the non-law-abiding cannabis Growers.
You see examples of this in every County, throughout California.
If you permit and allow the large Cannabis grows in Redwood Valley, you will see an exodus of the small business owners – like myself, as well as many other small businesses, who will not be able to live in this area that is populated with non-law-abiding folks and criminal activity.

The typical cannabis grower does not volunteer at the local Fire dept, they don’t pick up trash on the roadside – or check on their neighbor. They also don’t fully report or claim their income from their crop – As do the vineyard owners or other small business.
Actually – come harvest time the people they employ to harvest the crop deplete the Food Banks and Soup Kitchens in the area. They do not contribute financially to their community at all, unless they are trying to obtain a permit, to line their pockets with the monies from their product.

A local cannabis grower here is Redwood Valley attended a recent Board of Supervisors meeting to defend his position and pending permits to grow cannabis, in his neighborhood – which is again is made up of 70 percent single family residents.
He argued that he is a ‘Family Man” and a good citizen, citing that his wife is a Nurse at Kaiser Hospital. Since there is no such hospital in Mendocino County it is very evident that he does not live in this area, the area that he is cultivating his crops in. He instead lives in Sonoma County, far away from the negative issues we have pointed out with the Cannabis grows. Sonoma County quite probably will not allow him to operate his large cannabis operation.
Please consider this letter in your Environmental Impact Report and know that it is supported by many Redwood Valley residents and Business owners
Sincerely
Cynthia Grant / Richard Sagan

From: Lieshi Galandil <Gelennil@outlook.com>
Sent: Thursday, August 31, 2023 8:03 PM
To: Public Comment@Cannabis
Subject: Comments re: EIR for the Licensing of Commercial Cannabis Cultivation in Mendocino County

Follow Up Flag: Follow up
Flag Status: Flagged

I am writing this in response to a request for public comment on the State's proposed EIR for our county's commercial cannabis cultivation ordinance.

First, I am very pleased that the State Department of Cannabis Control has stepped in to help come up with a thorough, legitimate EIR for cannabis cultivation in this county.

The reason for this letter is that, now that there is a request for public input on this new process, and I have been listening to the call-ins and other public comments during the Scoping Meeting on August 22 and elsewhere, I am concerned that the only input you seem to be getting is from the cannabis growers themselves. I haven't heard any comments from community members like myself who are very concerned about preserving and restoring the natural environment that has already been greatly impacted by illegal grows all over the county and continue to be, particularly in the most remote, difficult to monitor areas of the county.

One thing that concerns me is that Mendocino County currently has no road ordinance in place for rural areas. There are already hundreds, if not thousands of illegal roads being cut every year in this county with no oversight or attempt to monitor the damage to wetlands, oak woodlands, animal habitats or even the extreme erosion they cause. Private land owners can cut as many roads as they want, apparently. This is one important item I would like the EIR to address.

Another is the fact that there is no current, meaningful, or long-term method to measure water use for individual cannabis cultivation parcels in the unincorporated areas of the county, or the cumulative, long-term impact on the surrounding environment and downstream waterways over decades. This year has been an unusually good rain year, but it has still not been enough to recharge the aquifers that supply the many rivers, streams and other water sources of this county. Despite what many growers say, marijuana, at least the way it is grown here, requires a very large amount of water daily. Cannabis nurseries require great quantities of water to regularly flush out their systems and then replace it. Sadly, because drought is the "new norm" in California (despite this year's anomaly), and the woods and wildlife that depend on our quickly-diminishing natural water supplies are already greatly stressed, we can't afford to use up (and pollute) more of this precious resource.

Illegal water diversion has been a common practice over decades in the remote areas of this county, robbing the natural rivers and streams of healthy flows and sending massive amounts of sediment (and pollutants) downstream from human-caused erosion. If a permit applicant can prove they have enough water, whether from wells or water storage, will there be a measure to determine its original source and the impact of their use on the surrounding or downstream,

hidden water sources? I do not think there has ever been a thorough study conducted in this county of the various streams and other water sources, let alone the changes they have undergone over the years, particularly due to cattle grazing, logging, and cannabis cultivation. The impacts and their causes are extensive and complex, and difficult to separate by type of use.

Finally, in the scoping meeting on August 22 I heard several commenters say they didn't want follow-up inspections performed by county cannabis officials to renew their licenses, that a notarized affidavit from the grower should be enough to show no new changes. They say that the surveillance cameras the county now uses to spot infractions should be enough, but in the most heavily wooded areas, I can assure you they are not. Please do not allow the removal of provisions for follow-up and/or random inspections on permitted cannabis cultivation and related operations sites.

Thank you for considering my input.

L. Galandil

From: Cyndi Barra Woskow <barrafamilyvineyards@comcast.net>
Sent: Thursday, August 24, 2023 1:46 PM
To: Public Comment@Cannabis
Subject: EIR for the Licensing of Commercial Cannabis Cultivation in Mendocino County

Follow Up Flag: Follow up
Flag Status: Flagged

Department of Cannabis Control (DCC)

Attention: Angela McIntire-Abbott

Our family has been long-time residents of Mendocino County (100+ years). We are grateful for the DCC's intent to conduct an Environmental Impact Repot (EIR) for the Licensing of Commercial Cannabis Cultivation in Mendocino County. Our comments and concerns regarding the cannabis impact on our community and quality of life are listed below:

Aesthetics: Numerous unsightly fences and hoop houses, with more being added all the time. Unsightly and often toxic debris from abandoned grow sites.

Agriculture & Forestry Resources: Some existing vineyard owners have been informed by wineries their fruit may be rejected if their vineyard is too close to cannabis grows that negatively affect grape quality for wine production. Introduction of new pests from cannabis crop to existing crops (mites, etc.).

Air Quality: Noxious odor permeates homes located next to cannabis grows and prevents homeowners from opening their windows in summer months to avoid the unpleasant odor, preventing homeowners from enjoying the fresh air in their own yard or patio. Light pollution from greenhouses adversely affects the night sky.

Geology & Soils: Hazardous products leach into the soil and water table.

Hazards & Hazardous Materials: Use of pesticides, herbicides, insecticides not safe to humans or the environment. For example… Ferric Sulfate, Bifenthrin, Carbofuran. Degraded plastics from hoop houses and associated plastic tubing, gas cans, propane tanks, firearms among other concerning items found at cannabis grow sites.

Hydrology & Water Quality: Water diversions from local rivers & streams deplete aquifers & existing wells that homeowners & local farmers depend on to exist & thrive. Water theft from existing wells, fire hydrants, local business, rivers and streams has been reported. Toxic pesticides, herbicides, insecticides & other materials contaminating our diminishing water sources. Ecosystems in rivers and streams (fish, birds, frogs, etc.) are disrupted by these water diversions and toxic contaminates in our local water ways.

Land Use & Planning: Cannabis grows located too close to existing homes deflates home values, invites illegal activity to neighboring homes, affects views from existing homes who used to see mountains & now see fences & hoop houses. All of this negatively affects the quality of life for existing homeowners who have significant investment in their properties.

Noise: Noise pollution from generators, dehumidifiers, fans, & water trucks.

Population & Housing: Big money infiltrating the housing market inflates real estate prices and reduces available housing for local residents. Buyers from out of the area seeking to profit from the cannabis industry are often not very neighborly or community minded. Cannabis properties often have guard dogs that bark and bark and bark, which is a noise nuisance degrading the neighborhood. A crop that requires guard dogs, fences and firearms is not compatible with our peaceful community environment.

Public Services: Cannabis industry is taxing our Public Safety agencies, depleting services and funds that are desperately needed in other parts of our community.

Recreation: Fear by outdoor enthusiast to use public & private lands for outdoor recreation (hiking, fishing, camping, etc.) due to hostile encounters from cannabis grows.

Transportation: Large trucks & increased traffic on local roads causing untimely maintenance that there is no funding for. This increased traffic also causes our small rural roads to be less safe for pedestrians, cyclists, horseback riders, and other drivers.

Utilities & Service System: Increased strain on our electrical grid & water districts.

Wildfire: Remote cannabis grows, especially clandestine ones, contribute to wildfire dangers because they may go unreported and be difficult to access by fire crews.

We believe these stated concerns confirm we desperately need a thorough EIR to evaluate the adverse impact of cannabis cultivation operations in Mendocino County.

Sincerely,

Lori Barra
Cynthia Barra Woskow
Christina Barra
9901 East Road
Redwood Valley, CA 95470

From: Pete's Tractor & Pump, Inc. <petestractor@yahoo.com>
Sent: Thursday, August 24, 2023 4:18 PM
To: Public Comment@Cannabis
Subject: Attn: Angela McIntire-Abbott regarding EIR for the Licensing of Commercial Cannabis Cultivation in Mendocino County

Follow Up Flag: Follow up
Flag Status: Flagged

Good Afternoon Ms. McIntire-Abbott,

This letter is in regards to the State Department of Cannabis Control intent to prepare a draft Environmental Impact Report (EIR) for the Licensing of Commercial Cannabis Cultivation in Mendocino County.

My wife, Tanya and I have 60 acres in the heart of Redwood Valley. Our homes and our vineyards are right in the middle of cannabis greenhouses. We were here before this activity started crowding our area. Together my wife and I have built our business with our blood, sweat, and tears. We did it on our own, with no inherited wealth, and by doing everything by the book.

In the 20 plus years we have been here, we have worked together with our neighbors to find solutions to our issues. Collaboration and compromise have made Redwood Valley what it is today. We attempted to maintain this level of cooperation and courtesy with the people that moved into our area and that same attitude was not returned to us.

Our lives are impacted by the cannabis operations surrounding our homes. As is common courtesy on our road, we check in with our neighbors before doing certain things to make sure it will not greatly impact or harm them. We had approached these cannabis growers before they started to prepare their sites for hoop houses politely asking them to consider our opinions, such as placing greenhouses further back on the property to help keep the smell as far away from us and our vineyard as possible and we were met with no compromise. I even went so far as to offer free service and help, like grading sections of others property, to make this agreeable but there has been no effort to work with us. A major concern we have is of the stench that comes from the cannabis tainting our grapes which could put our grape harvest in jeopardy with the wineries. Another major concern we have is where we've seen how they place their greenhouses as close to water sources as possible. For an example one went in close to a Freshwater Pond and another near Freshwater Forested/Shrub wetland. One site also drilled a well near an adjacent residential well of a home that

depends on well water only. Too many homes in our area rely on well water only, so the Environmental Impact Report as pertains to water quantity and quality should be done and a way to continually monitor them after the EIR is put into place.

The cannabis grows plague our community with stench year-round, stacks of hoop houses block our once scenic view, and they disrupt our fragile water systems. Growing grapes is our livelihood. We don't have to guard our vineyard for fear of intruders and theft. Never have we seen such riff raff tooling around the valley until these grows evolved. The bottom line is that we are not okay with what is happening in our piece of Redwood Valley. We have taken action in the process the Board has afforded constituents in hopes that a re-zone would take place. However, unfortunately our board of supervisors did not allow for this to happen. We want to keep our homes and community as a place for the next generation, a safe place for our grandchildren.
I ask that you listen to the community and the overwhelming support for the concerns we have regarding the impact not only environmentally but also for the quality of life not to mention the crime that goes hand in hand with these cannabis grows surrounding our once beautiful valley.

Thank you for your time,

Pete & Tanya Lucchesi
707-272-0474

From: Marnie Birger <kookeeme@aol.com>
Sent: Thursday, August 31, 2023 4:39 PM
To: Public Comment@Cannabis
Subject: CEQA EIR public comments

Follow Up Flag: Follow up
Flag Status: Flagged

8/31/2023

Dear DCC, Ascent, and all interested parties,

We read the notice of preparation and we understand the focus as it was stated for the scoping process, "The EIR will programmatically evaluate the environmental impacts of the DCC's annual licensing of commercial cannabis cultivation operations in the county as well as the environmental impacts of future licensed commercial cannabis cultivation operations."

We listened to the State scoping meeting and we have read the letter to the Mendocino BOS from Director Nicole Elliot of the DCC regarding the CEQA process. We appreciate the State stepping into partnership with our County geared at transitioning the Phase One cohort from Provisional to Annual licenses.

We're located in Covelo, Round Valley.

We request that the scope of the State CEQA EIR delineate the difference between Phase One farms, who all had to prove prior cultivation to qualify for Phase One. Phase One farms having to prove prior cultivation to even qualify for Phase One is a very important point.

We understand that farms that are looking to expand, and especially new cultivation sites being considered in Phase Three, will likely have to do additional environmental reports to guarantee that they fall within the scope of the EIR. 10,000 sq ft or less is a small farm. I request the state see the treasure of this craft community for the benefit of every Californian. Connoisseurs want craft cannabis. Protect and embrace the remaining farmers.

We strongly believe Phase One farms should be exempt, or grandfathered into CEQA approval via the EIR. These small farms have already completed the required environmental assessments, have already been inspected by the various County and State agencies, and in many cases, are already approved, or in a queue with their documents ready and waiting to be approved.

Using multiple pathways for CEQA will ensure the highest number of farms can achieve their State annual license. Finding a way to accept Appendix G documents will help the DCC process those in the program who have already completed the checklist.

Using the MND is imperative. It was written to cover upward of 10,000 small farms and we have less than 1000 small farms using approximately 200 acres of land right now in Mendocino as part of Phase One of our ordinance. These numbers are notable, especially when cannabis cultivation is compared to other agricultural crops in our County, such as the **16,000+ acres of grape vines.**

We heard at the scoping meeting, and as stated in the quote from the DCC above, the EIR will take into account all cannabis activities present and future. We believe the proof of prior cultivation, and therefore, every single farm in the Phase One cohort, with an emphasis on those who have not expanded since the ordinance passed or who have done so with proper approvals, are covered under the prior MND.

As you know, 10,000 sq ft and under, is considered by the State as a small farm, and anything above it is classified as a medium or large farm in the California cannabis sector. Our farm, like many in Mendocino County, is also completely **outdoor.** One crop, One season, with nature. We implement Best Management Practices, JADAM natural farming, regenerative farming practices. Mendocino County has a rich history of sustainable agriculture as a center of the back-to-the-land movement. We were the were the first County in the USA to vote for non-gmo standards regarding commercial crops. We are the environmentalists. Many, if not all of the Phase One farms that are active in the local cannabis program are longtime stewards of the land. **These types of documented best management practices should also count toward exemptions from CEQA. The requirements have already been fulfilled.**

Thank you for allowing public input and considering our comments.

Marnie Birger

Department of Cannabis Control
c/o Angela McIntire-Abbott
2920 Kilgore Road
Rancho Cordova, CA 95670

August 31, 2023

Sent via email to publiccomment@cannabis.ca.gov

RE: DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE LICENSING OF COMMERCIAL CANNABIS CULTIVATION IN MENDOCINO COUNTY PROJECT

Ms. McIntire-Abbott,

The Mendocino Cannabis Alliance[1] (MCA) appreciates the opportunity to provide comment on the DCC's Notice of Preparation for the upcoming Environmental Impact Report on Mendocino County's cannabis cultivation state licensing.

It is noteworthy that the Mitigated Negative Declaration (MND)[2] for this County program anticipated up to 10,000 individual cultivation sites in all zones throughout Mendocino County. In the NOP, it is identified that the DCC has issued 608 Provisional Licenses thus far to local operators. Based on the most recent reporting[3] by the Mendocino Cannabis Department, we see a total of 827 active local Licenses or Applications. This number is down 34% from nearly 1300 total in 2020 at which point the Mendocino County Cannabis Crop Report Addendum[4] identified 290 acres of licensed canopy. Using the same math **it is not unreasonable to infer that our locally licensed canopy is now closer to 200 acres, which is less than one third of one square mile,** in a county of 3,878 square miles**.** By comparison, the 2021 Mendocino Crop Report identifies 16,500 acres of wine grapes in the County, or nearly 26 square miles.

What these numbers illustrate is the lack of significant impact created by this program, especially compared to what was originally projected and accounted for in the MND. This industry could increase in size 4x and still have only 5% of the footprint of local winegrape production. In this overall context of a lack of significant impact, we encourage the State and Ascent to consider the following recommendations:

1. The analysis should only include the impacts of all pre-existing and current activity, as well as future licensed site development, while distinguishing between the two different types. We do not want the cumulative impacts to be too great, while at the same time providing opportunities for sustainable development.

[1] https://mendocannabis.com/

[2] https://drive.google.com/file/d/1vp0-nwb5rc0Vu6Fn7_fyDUK7x_GYuKeU/view?usp=drive_link

[3] https://mendocino.legistar1.com/daystar.legistar6.sdk.ws/View.ashx?M=F&GovernmentGUID=MEND&LogicalFileName=5654eb50-c6d5-486e-8bfd-b97a1bf3a919.docx&From=Granicus

[4] https://mendocino.legistar.com/View.ashx?M=F&ID=10434646&GUID=CF10EE68-2412-487D-B161-9702223D8530

2. Include comparisons to other types of food and agricultural production in Mendocino County to provide the context of definition of significant or insignificant impact.

3. Include information on existing and overlapping Phase 1 requirements from all agencies related to items such as water source, regulations, diversion, land management practices, sediment, impacts to species and habitat, and other areas that are addressed by existing regulations

4. Include licensees water storage methods such as tanks and ponds as mitigating wildfire exposure.

5. Consider sustainable and regenerative farming and business practices employed by many local cultivators as environmental benefits that mitigate impact, as evidenced in some, but not all, cases by third party certifications such as the State sponsored OCal Comparable to the National Organic Program administered by CDFA[5], Sun + Earth Certified[6], Clean Green Certified[7] and others.

6. Consider, and account for, the many farms that are part of the Homestead movement in which operators live at their project sites. In our producer county most farmers are also residents on their sites, which helps reduce needed mitigation measures.

MCA is available to discuss and to give further input to the DCC and Ascent in their consideration of the Draft EIR for State Annual cultivation licensing in the context of the particularities of Mendocino County.

Sincerely,

Mendocino Cannabis Alliance
e: info@mendocannabis.com
p: 707.234.5568

cc: haschakj@mendocinocounty.org
mulherenm@mendocinocounty.org
curtisc@mendocinocounty.org
kiedrowskim@mendocinocounty.org
goinesm@mendocinocounty.org
mcburneys@mendocinocounty.org

5 https://www.cdfa.ca.gov/is/ocal.html
6 https://sunandearth.org/
7 https://cleangreencertified.com/

From: Bill Krawetz <billkrawetz@comcast.net>
Sent: Friday, September 1, 2023 11:28 AM
To: Public Comment@Cannabis
Subject: Comments on NOP for EIR of Commercial Cannabis Cultivation in Mendocino County.
Attachments: Cannabis groundwater pumping Navarro river study 2019.pdf; Impacts of Surface Water Diversions for Marijuna Cultivation on Aquatic Habitat in 4 NoCal watersheds.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Dear DCC,

The following are comments on what should be included in the EIR study. These items much be evaluated and properly dealt with for the EIR to be valid.

1. Illegal growers- The operations of these growers must be studied and accounted for. It is estimated there are significantly more illegal growers than legal growers. The local law enforcement team reported they only have the resources to deal with ~100 sites per year, yet there are tens of thousands growers. See attached article and highlights below:
   https://www.courier-journal.com/in-depth/news/crime/2021/12/17/mexican-drug-cartels-move-in-on-californias-shadow-marijuana-industry/6036056001/

   Highlights:
   Mendocino County Sheriff Matt Kendall told The Courier Journal there are as many as 10,000 illegal grows in his jurisdiction, a two-hour drive north of San Francisco. He tries to target the worst 100, which is all his small force can handle in a year.

   "We have international cartels successfully operating here" setting up multi-million dollar farm operations, said California Assemblyman Tom Lackey, R-Palmdale, a former highway patrolman.

   "They're poisoning our ground and stealing our water, and we have drought out here," he said.

   A glimpse at what he's dealing with: Christopher Wayne Gamble, who allegedly operated large illegal crops near the town of Willits, in central Mendocino County, is charged with murdering a 17-year-old boy and his father who came from Mexico seeking work, according to Mendocino County Superior Court records. detectives found the victims' headless bodies in April in a ditch under a pile of tires that had been set on fire.

   Illegal growers are using dangerous chemicals from Mexico that poison animals and contaminate soil.
   Armed criminal networks set up illegal grows on federal land in national forests.

Illegal cannabis used to make a nearly pure form of THC is linked to explosions that have burned children and killed adults.

Farmers once fetched up to $4,000 per pound, but a saturated market across the state has driven down prices to $400 or less. Illegal sellers can ship it to get triple the price on the East Coast, Sena said.

A decade ago, 20 acres with a house and barn would have sold for $200,000 or less. Now, it can fetch more than $1 million. "Almost everybody that grows dope up here is from San Jose,"

After doing flyovers, sheriff's investigators estimate there are a million pot plants on the valley floor(Covelo), an area about seven by eight miles. That's less than 2% of the county's landmass. Mexican drug cartels move in on California's shadow marijuana industry. The sheriff estimates that 95% are illegal

"Some of the marijuana being moved across the country is born on the back of slave labor," said Sena, who also heads up the Northern California Regional Intelligence Center. "Often the people brought in to do labor are mistreated" on illegal marijuana farms. Other farm workers, including young men used for sex and labor trafficking, weren't rescued in time. Some were forced to live in squalor without plumbing. Others ended up dead and many are missing, the sheriff said.

An average of more than 2 million cannabis plants were eradicated on federal land from 2007-2019 — more than a million of which was grown in California, Gabriel said.

2. Water impacts: Study the impacts of cannabis water usage on steam depletion and the impacts to wildlife and residents.
    a. CDFW study: "Impacts of Surface Water Diversions for Marijuana Cultivation on Aquatic Habitat in Four Northwestern California Watersheds" Included Mendocino County: See attached report. Highlights:
        i. Our results indicate that water demand for marijuana cultivation has the potential to divert substantial portions of streamflow in the study watersheds, with an estimated flow reduction of up to 23% of the annual seven day low flow in the least impacted of the study watersheds. Estimates from the other study watersheds indicate that water demand for marijuana cultivation exceeds streamflow during the low-flow period.
    b. Nature Conservancy/others study on Navarro River area. See attached report. Highlights:
        i. points out the linkage between reduction in streamflow with groundwater pumping. In the Navarro study wells 3/4 mile away from a stream have a big impact. The study seems to use actual sites but estimates of usage.
        ii. Cannabis wells cause a disproportionate amount of stream depletion. Cannabis well are less than 25% of total wells (18% of total) but caused over 50% of depletion. The study looks at both Cannabis and Residential uses
        iii. Residential uses cause ~5X depletion of cannabis. But there are approximately 4.3x more Residential well (1314 total) than cannabis wells (302 total)
            1. Comment: Comparing Residential use to cannabis use might be misleading. Residential use includes drinking, cooking, bathing, toilets, gardens, etc. Cannabis is one discretionary use.
        iv. Streamflow depletion increases nonlinearly when pumping within ¾ mile of stream. Most wells (over 50%) within this range
        v. Streamflow depletion worse in late summer when groundwater is a critical source of base flow to ecologically important streams. Residential and Cannabis use peak in Summer
        vi. Stream depletion mainly caused by well distance from stream and well usage. Subsurface properties such as transmissivity are next important

3. Fire Safe Road regulations: Commercial Cannabis Cultivation operations must adhere to and only be allowed to operate in locations that met the Fire Safe Regulations:

a. Summary of Updated State Minimum Fire Safe Regulations, Comments from Board of Forestry's Final Statement of Reasons August 17, 2022
b. Synopsis:
    i. The State Board of Forestry and Fire Protection (BOF) unanimously approved the updated State Minimum Fire Safe Regulations (FSR) at its August 17, 2022, meeting. These regulations retain the identical road regulations as in the current 2020 FSR. This includes 20 ft wide roads, dead-end roads no longer than 800 ft to 1 mile, as well as many other specifications. The BOF, as well as the California Attorney General's Office, decisively confirmed that the FSR apply to all existing roads, and cover access to as well as within a parcel. The Exception process must follow strict requirements with material facts to demonstrate Same Practical Effect within a development perimeter. For subpar public roads needing improvement to meet the FSR, it's up to the county to determine either if the county will pay or if it requires the applicant to pay, or if no upgrades are made, to prevent the development from proceeding.
c. Relevant Excerpts from the State Fire Safe Regulations and the Final Statement of Reasons.
    i. The State Board of Forestry and Fire Protection (BOF) unanimously approved minor revisions to the State Minimum Fire Safe Regulations (FSR) at its August 17, 2022, meeting and the Final Statement of Reasons (FSOR), for formal processing by Office of Administrative Law. These regulations govern all new development in the State Responsibility Area (SRA) as well as Very High Fire Hazard Severity Zone (VHFHSZ) in the Local Responsibility Area (LRA). The revised regulations retain the identical road regulations as are in the current 2020 FSR, including:
    ii. • Minimum 20 ft wide roads for all 2-way roads (two 10-ft wide traffic lanes excluding striping and shoulders)
    iii. • Dead end roads no longer than 800 ft, 1320 ft, 2640 ft or 1 mile, depending on smallest parcel served (i.e., ranging from 800 ft dead-end length limit if any parcel served is less than 1 acre, to 1 mile dead-end length limit if all parcels served are 20 acres or more)
    iv. • Grades of no more than 16%, up to 20% with mitigations
    v. • Specifications for curve radius, bridge weight ratings, gates, road surface, turnouts, turnarounds
    vi. • Length of 1-way roads no longer than 1/2 mile, plus other requirements including to connect with 2-way roads (i.e., minimum 20 ft wide) at each end
    vii. • Only 20 ft wide roads, not 10 ft wide driveways, can access any commercial facility
    viii. • Must provide for safe concurrent fire apparatus ingress and civilian evacuation, and unobstructed traffic circulation during a wildfire
d. Exceptions can be applied for by applicants within a parcel or development perimeter (e.g., on private roads), but only if applicants provide material facts demonstrating the Same Practical Effect within that perimeter as provided by the standards enumerated (see above) in the FSR (FSR § 1270.07; FSOR p. 593).
e. Local regulations must at minimum meet the criteria of the FSR. Local jurisdictions cannot apply exemptions not set forth in the FSR (such as exempting existing or pre-1991 roads as sought by Sonoma County in its 2020 ordinance, which the BOF accordingly refused to certify) (§FSR § 1270.05; FSOR p. 594).
f. Public roads must also meet the minimum FSR for any new development to occur. There is no mechanism specified in the FSR for Exceptions on public roads outside a development or parcel perimeter. BOF has previously explained that if improvements are needed to such public roads, it's up to the county to determine whether such improvements are paid for by the developer or the county (October 23, 2020, letter from BOF to Sonoma County Counsel). If not in compliance, then the new development cannot occur if accessed by subpar public roads.
g. The FSR apply equally to public and private roads (FSR § 1270.01(y); FSOR pp. 5-7). BOF has also reiterated a 2019 California Attorney General's letter confirming that the FSR apply to existing public access roads leading to a proposed development that are beyond the development perimeter (FSOR pp. 6-7). BOF reiterated these statements in response to and thus contradicting assertions in a May 27, 2022, letter to BOF from Rural County Representatives of California (RCRC). RCRC erroneously claimed

that the FSR only applied to the limited area within a parcel or development perimeter and not to existing roads outside the perimeter, misapplying the BOF definition of "Defensible Space". However, RCRC failed to note that the BOF definition of Defensible Space is limited to applicability of Exceptions, not to scope. Importantly, neither that definition nor Exceptions are included in nor limit the scope of the underlying code PRC 4290. Rather, BOF wrote both definitions to delineate a mechanism for requesting Exceptions within a parcel or development perimeter. RCRC wrongly tried to apply this specific narrow definition of Defensible Space – to reiterate, which definition is limited only to Exceptions in the FSR - to instead limit the scope, despite that scope was never so limited by BOF in the FSR as that would violate PRC 4290. Furthermore, as the vast majority of roads providing access to new development are outside a parcel/development perimeter, the entire Article 2 of the FSR, which encompasses extensive road specifications (i.e., road widths, curve radius, turnarounds, grade limits, bridge weight limits, dead-end road limits across multiple parcels, etc.), would be essentially meaningless if the FSR were limited to within a parcel or development perimeter (where the infrastructure is mainly driveways and occasionally a private road). Sonoma County should not rely on RCRC's flawed and indefensible argument in its May 27 letter, which was refuted by BOF in the FSOR (p.557).

h. It is important to understand that roads only need to meet the FSR for new development (residential, commercial, or industrial); roads do not need improvement for existing development. As the FSR have been state law since 1991, any new development after 1991 should have only been on roads meeting the FSR. Unfortunately, this was not always the case in Sonoma County.

i. The County must adhere to state law in the FSR for all new development. If an Exception is requested, it must follow the requirements of the FSR including with material facts supporting that it provides the Same Practical Effect as the standards enumerated in the FSR (§ 1270.07; FSOR, p. 593). As noted above, such Exceptions are limited to roads and driveways within a parcel or development perimeter. The County has violated the FSR and Exceptions provision on many approvals including several in 2021, approving new development accessed solely by subpar public roads, and stating that Exceptions were documented providing Same Practical Effect when in fact the public record confirmed that no such Exception documents exist. We hope going forward that the County will adhere to the FSR.

j. To assist counties, the BOF has agreed to work with CalFire leadership on training for CalFire employees and local jurisdictions on correct implementation of the FSR. Such training will benefit the County in streamlining its development approval processes, including correctly applying the FSR to existing roads both within and outside a parcel or development perimeter, and on preventing abuse of Exceptions which would undermine the intent of the FSR.

4. <u>The DCC NOP document provides little definition</u>:

   a. NOP states "The NOP provides sufficient information describing the Project and its potential environmental effects to allow recipients the opportunity to provide a meaningful response related to the scope and content of the EIR" and provides the following Project Description: PROJECT DESCRIPTION

      i. The DCC has issued approximately 608 provisional commercial cannabis cultivation licenses in Mendocino County. The Project consists of the DCC actions to approve annual licensing of such commercial cannabis cultivation operations in Mendocino County under California Code of Regulations, title 4, section 15002.The EIR will programmatically evaluate the environmental impacts of the DCC's annual licensing of commercial cannabis cultivation operations in the county as well as the environmental impacts of future licensed commercial cannabis cultivation operations.

   b. Considering the NOP is only 3 pages long and written at a very high level, it is difficult to impossible for the public to fully understand the full scope to properly comment.

Thanks
Bill Krawetz

Cannabis and residential groundwater pumping impacts on streamflow and ecosystems in Northern California

Environmental Research Communications

PAPER

Cannabis and residential groundwater pumping impacts on streamflow and ecosystems in Northern California

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Abstract

Cannabis is an emerging agricultural frontier, but due to its quasi-legal status its environmental impacts are poorly understood. Where cannabis is irrigated by groundwater, pumping can lead to streamflow depletion in surrounding streams which may impair other water users or aquatic ecosystems. Here, we investigate the impacts of groundwater pumping for cannabis irrigation at the scale of the watershed, the individual well, and the stream segment, and contextualize by comparing with residential groundwater use. Combining mapped cannabis cultivation and residential structure locations with grower reports of irrigation water sources, we develop distributed estimates of groundwater pumping and associated streamflow depletion caused by cannabis and residential users within the Navarro River Watershed in Northern California (USA). An estimated 73% of cannabis cultivation sites and 92% of residential structures in the watershed rely on groundwater, and groundwater abstraction leads to streamflow depletion during late summer when groundwater is a critical source of baseflow to ecologically important streams. However, streamflow depletion caused by cannabis cultivation is dwarfed by the impacts of residential use, which causes >5 times as much streamflow depletion and is concentrated close to ecologically important stream segments. Focusing on cannabis, a small number of wells (<25%) cause a disproportionate amount of depletion (>50%), and significant predictors for impacts of a well are the annual pumping rate, the distance to the closest stream, and the transmissivity between the well and the stream. Streamflow depletion increases nonlinearly when pumping occurs within 1.2 km of streams, and most cannabis and residential groundwater use is within this critical distance. Given the rapid increase in cannabis cultivation, these results indicate that potential streamflow depletion from groundwater irrigation of cannabis is a current and future concern, and will be superimposed on top of significant depletion already occurring due to residential use in the region studied.

1. Introduction

Cannabis (*Cannabis sativa* L.) cultivation has expanded rapidly in recent years in California and elsewhere, and with unknown impacts on water resources (Bauer *et al* 2015, Stoa 2015, Butsic *et al* 2018). While estimates of cannabis water use are highly uncertain due to a lack of data, previous work has found that cannabis is often cultivated close to sensitive aquatic habitats and irrigation requirements can exceed summer low flows in areas with substantial cultivation (Bauer *et al* 2015, Butsic and Brenner 2016). Accordingly, quantifying the environmental impacts of cannabis irrigation has been identified as a key research priority (Ashworth and Vizuete 2017).

Most previous work on cannabis cultivation has focused on surface water diversions (e.g. Bauer *et al* 2015). However, recent work indicates that in some regions such as Northern California, groundwater is the primary water source for most cultivators and therefore an underappreciated concern (Dillis *et al* 2019a, 2019b, Wilson *et al* 2019). One potential negative impact of groundwater pumping is reduced streamflow ('streamflow depletion') due to the capture of groundwater which otherwise would have discharged into a stream (Barlow *et al* 2018). Since groundwater provides a relatively stable and cool supply of water to streams, it is critical to the survival of aquatic organisms such as rare and endangered anadromous fish (Larsen and Woelfle-Erskine 2018, Greer *et al* 2019).

Here, we ask, *what are the potential impacts of ongoing groundwater pumping for cannabis cultivation in the Navarro River Watershed (California, USA) on streamflow and aquatic ecosystems*? We answer this question using an analytical depletion function, a newly developed tool for estimating streamflow depletion with low data and computational requirements (Zipper *et al* 2019a), to evaluate streamflow depletion caused by groundwater pumping for cannabis cultivation and contextualize this depletion via comparison to pumping for residential groundwater use. Specifically, we ask:

(1) At the watershed scale, how much streamflow depletion is potentially associated with groundwater pumping for cannabis cultivation, and how does it compare with pumping for residential groundwater use?

(2) At the well scale, how does streamflow depletion vary among pumping wells and what are the most important factors driving this variability?

(3) At the stream segment scale, what locations would pumping wells have the greatest negative impact on ecologically important stream segments?

2. Methods

2.1. Study site: Navarro River Watershed, CA

The Navarro River Watershed (816 km^2) is in Mendocino County, California, USA. Streamflow in the Navarro River is highly seasonal, and streamflow in late summer and early fall are dominated by baseflow (figure 1(a)). These cool groundwater inflows are critical for aquatic ecosystems including anadromous fish (section 2.1.2; Spence *et al* 2008, National Marine Fisheries Service 2016). However, there are significant long-term decreasing baseflow trends in August (-0.11 mm $decade^{-1}$), September (-0.11 mm $decade^{-1}$), and October (-0.45 mm $decade^{-1}$) based on the 1951–2018 water years, which coincide with the time of year when baseflow is particularly critical for aquatic ecosystems.

Timberland is the primary (~70%) land use in the rural Navarro River Watershed, followed by rangeland (~20%), agriculture (~5%), and limited residential areas (North Coast Regional Water Quality Control Board 2005). Irrigated agriculture has expanded since the 1960s, and 97% of traditional crop areas (mostly vineyards) use surface water for irrigation (McGourty *et al* 2013). The Navarro River Watershed is in the 'Emerald Triangle' region (Humboldt, Mendocino, and Trinity Counties), an area well known for significant cannabis cultivation. There is growing concern that cannabis cultivation is an expanding environmental stressor in the region (Carah *et al* 2015, Butsic *et al* 2018). While historical cannabis cultivation data are not available for the watershed, widespread but small-scale cultivation in the region began in the late 1960s, with further expansion in the 1980s due to rising prices (Raphael 1985, Corva 2014, Polson 2018). Key statewide legal changes leading to additional expansion in the region occurred in 1996, when Proposition 215 legalized medical cannabis, and 2016, when Proposition 64 legalized recreational cannabis. Recent estimates have found that the area under cultivation in Mendocino and Humboldt counties nearly doubled between 2012 and 2016 (Butsic *et al.* 2018).

2.1.1. Water use

We estimated the spatiotemporal distribution of groundwater use for cannabis cultivation and residential use in the Navarro River Watershed using a combination of existing datasets and new statistical models. These methods are described in detail in the supplemental information is available online at stacks.iop.org/ERC/1/125005/mmedia. Only 3% of traditional agricultural acreage in the watershed is irrigated using groundwater (McGourty *et al* 2013), so this water use was not considered in our analysis.

Cannabis cultivation locations were identified from high-resolution aerial imagery in a previously mapped dataset (Butsic and Brenner 2016, Butsic *et al* 2018). Based on data from annual grower reports received through the North Coast Regional Water Quality Control Board (NCRWQCB), we developed two statistical models to predict locations and amount of groundwater withdrawals for cannabis cultivation. These models (described in detail in the supplemental information) include a random forest model using site physical, hydrological, and infrastructure characteristics to determine which cultivation locations used groundwater for irrigation and a multiple linear regression model using cultivated area and growing conditions to predict the monthly amount of

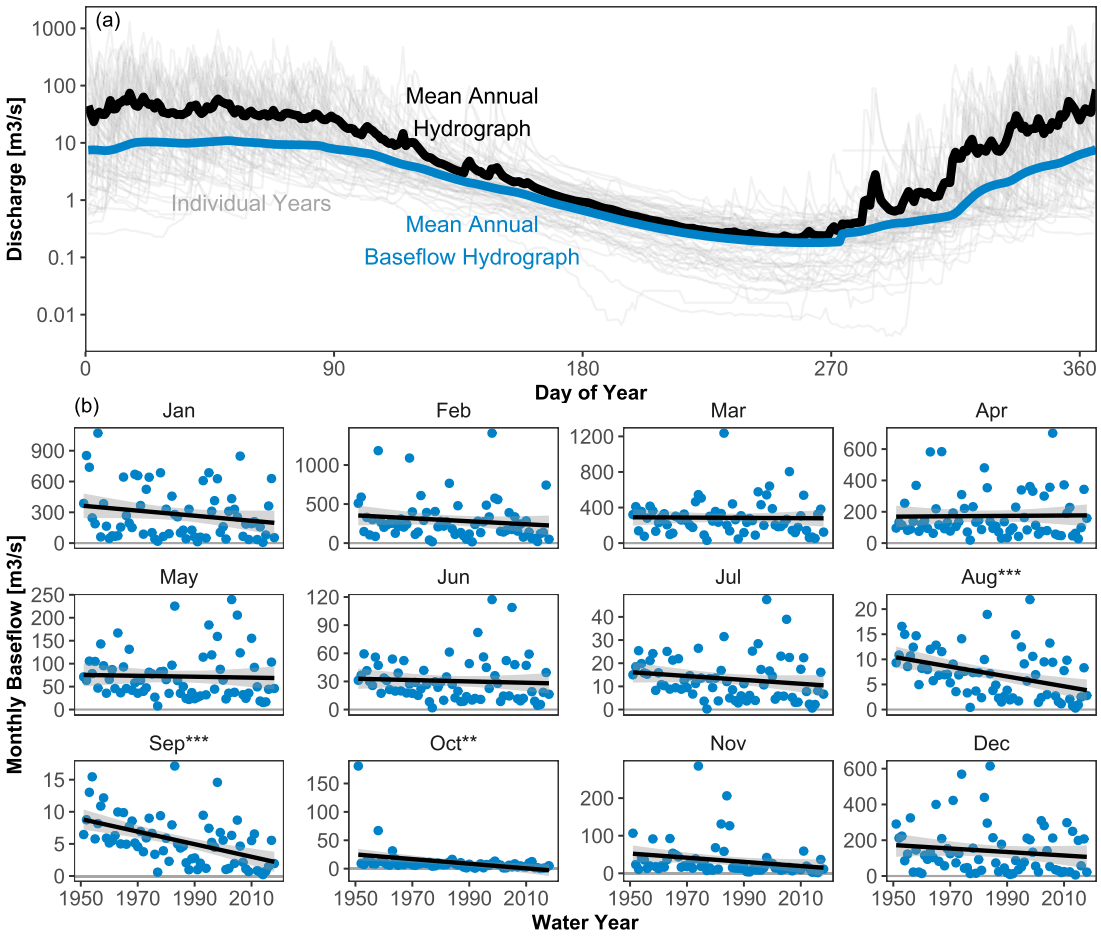

Figure 1. (a) Daily discharge (gray lines), mean daily discharge (black line), and mean daily baseflow (blue line) for the Navarro River (USGS gauge 11468000) for 1951–2018 water years, modified from Zipper *et al* (2018). (b) Mean monthly baseflow for 1951–2018 water years, with linear trend line in black. Linear trends are significant in starred months (** indicates $p < 0.01$; *** indicates $p < 0.001$). Note that *y*-axes differ between panels. Baseflow separation using (Nathan and McMahon 1990) digital filter.

irrigation applied at each site. After applying these models to the 411 parcels containing mapped cultivation sites, we predicted 302 parcels (73%) would use groundwater which is consistent with regional-scale estimates (Dillis *et al* 2019a). We used these pumping estimates as a representative monthly pumping schedule, which we then repeated for the full 50-year period of analysis.

To contextualize cannabis impacts, we also estimated the amount and impacts of residential groundwater use (i.e., homes with wells) using mapped residential structure locations (The Nature Conservancy, unpublished data) as described in the Supplemental Information. We screened out known points of surface water diversions from the California electronic Water Rights Information Management System (CA State Water Resources Control Board 2019 a), and estimate 1314 of 1423 residential structures (92%) in the Navarro River Watershed are groundwater-supplied, which is consistent with regional Resource Conservation District staff estimates that the overwhelming majority of residences use groundwater (personal comm., Linda MacElwee, Mendocino County Resource Conservation District). We estimated monthly water use for each property based on per capita water use data (CA State Water Resources Control Board 2019b) and average household size estimates (Mendocino County Water Agency 2010). Reported per capita water use spanned June 2014-February 2019, so we average monthly household water use across all years to generate a representative monthly pumping schedule, which we then repeated for the full 50-year period of analysis.

2.1.2. Stream ecological value

To identify streams with high ecological value, we used intrinsic habitat potential estimates for coho salmon (*Oncorhynchus kisutch*) in Northern California from Agrawal *et al* (2005). We selected coho salmon as the species of interest due to their high sensitivity to stream temperature conditions during late summer low flows (Welsh *et al* 2001), which are strongly dependent on groundwater inflow (Spence *et al* 2008, Gleeson and Richter 2018), and their status as an endangered species at state and federal levels (National Marine Fisheries Service 2012). The intrinsic habitat potential represents the likelihood (0–1) that a stream segment will have suitable habitat for a given species based on the channel gradient, valley width, and discharge. Following regionally-developed

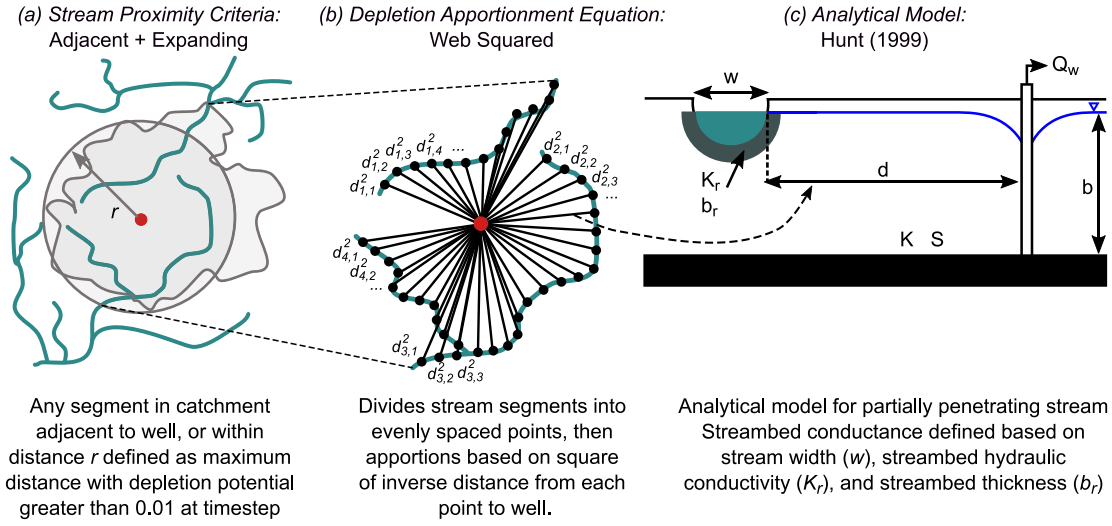

Figure 2. Diagram showing components of analytical depletion function: (a) stream proximity criteria, (b) depletion apportionment equations, and (c) analytical model.

standards (National Marine Fisheries Service 2016), we used a threshold of ⩾0.7 to indicate high quality habitat potential (figure 4). We aggregated the raw stream segment estimates of intrinsic habitat potential (NOAA; mean segment length = 85–126 m depending on species) to match segments in the US National Hydrography Dataset (NHD; mean segment length = 1560 m) with any NHD segment containing a high potential NOAA segment classified as high potential.

2.2. Calculating streamflow depletion

2.2.1. Analytical depletion function overview

We used an analytical depletion function (figure 2) to estimate the quantity and timing of streamflow depletion from cannabis and residential groundwater use. Analytical depletion functions, developed in Zipper *et al* 2019a, combine: (i) stream proximity criteria, which determine the stream segments that may be affected by a well; (ii) a depletion apportionment equation, which calculates the relative proportion of total streamflow depletion occurring in each stream segment meeting the proximity criteria; and (iii) an analytical model, which estimates the total streamflow depletion for each stream segment which is then scaled using the depletion apportionment results. The output of an analytical depletion function is the streamflow depletion in each stream segment in response to a given well.

Based on previous work comparing analytical depletion functions for the region (Zipper *et al* 2019a), we used the 'Adjacent + Expanding' stream proximity criteria (figure 2(a)), the web squared depletion apportionment equation (figure 2(b); equation S1; Zipper *et al* 2018), and the Hunt (1999) model (equation S2). To simulate monthly pumping schedules developed in section 2.1, we used the superposition approach described in Jenkins (1968). This analytical depletion function was tested against 49 other analytical depletion functions and found to produce the most accurate estimates of depletion for the Navarro River Watershed across a number of performance criteria (Zipper *et al* 2019a). Analytical depletion functions were implemented using the streamDepletr package (Zipper 2019) for R, and described in detail in the Supplemental Information and Zipper *et al* 2019a.

2.2.2. Analytical depletion function inputs

Analytical depletion functions require input data describing stream network geometry , the well, and hydrostratigraphic conditions. See the Supplemental Information for a detailed description of these inputs.

For inputs describing the stream network geometry, we used the National Hydrography Dataset to map stream locations, and an empirical relationship between drainage area and stream width developed in Zipper *et al* 2019a. The total extent of our domain included the Navarro River Watershed and adjacent watersheds (figure S2) so that wells could have impacts beyond the watershed borders.

For inputs describing the well, we used the spatial locations and pumping schedules for cannabis cultivation and residential structures described in section 2.1. Well screen depths were not reported in the NCRWQCB reports used to model well locations and pumping rates, so we used the screened interval for the closest Well Completion Report from the California Department of Water Resources (https://dwr.maps.arcgis.com/apps/webappviewer/index.html). For the synthetic wells used to map the sensitivity of streams to pumping

throughout the watershed (section 2.3; figure S2), we defined the screen length as the mean of production wells in the well completion report database and set the top of the screen at the estimated water table elevation.

Though detailed measurements of inputs describing hydrostratigraphy are not available from within the Navarro River Watershed, we synthesize data from nearby watersheds in the same regional geological setting to inform our study. In the nearby Elder Creek watershed, Dralle *et al* (2018) describe thin soils overlying a fractured and saturated bedrock system driving hillslope hydrology in the region, and in lowland portions of the domain mapped unconsolidated sedimentary aquifers are present along the Navarro River and coastal areas (CA Department of Water Resources (2016)). Accordingly, we adopt a two-layer conceptual model in which fractured bedrock is overlain by unconsolidated sediment of variable thickness corresponding to the bedrock depth (Hengl *et al* 2014, 2017; figure S2). In hillslopes, this top layer is thin and effectively ignored in our streamflow depletion calculations because the top layer is above the water table and therefore not considered in our calculations of effective transmissivity (see below). In low-lying areas along the Navarro River and coast, the top layer is thicker (up to ~35 m) and represents the alluvial aquifer. We define the top layer's hydraulic conductivity as 4.5×10^{-3} m s^{-1} based on pumping tests from the alluvium around the Russian River (Su *et al* 2007), a value which is also consistent with surficial soil estimates of hydraulic conductivity from Dralle *et al* (2018). Complete hydrostratigraphic properties for each of these layers are defined in table S2.

To calculate effective transmissivity and effective storativity, we averaged transmissivity and storativity between each well location and the closest point to that well on each stream segment, meaning that these inputs are unique for each well-stream combination (equations S5–S7). We followed Reeves *et al* (2009) to estimate streambed conductance (equation S3) using the hydraulic properties of the aquifer at the location of each stream segment. In this approach, streambed conductance is a lumped empirical parameter accounting for various aspects of the real world which are not addressed in analytical models including streambed properties, anisotropy, and stream-aquifer geometry (Kollet and Zlotnik 2003, Glose *et al* 2019). Groundwater recharge is not a necessary consideration for this study because recharge does not affect either the distribution or magnitude of streamflow depletion unless the pumping itself leads to a change in recharge, which we assume is not the case here (Bredehoeft *et al* 1982, Feinstein *et al* 2016).

2.3. Quantifying watershed-, well- and stream-scale impacts

For watershed-scale impacts, we used the analytical depletion function to estimate monthly cannabis and residential streamflow depletion in the first, 10th, and 50th year after the onset of pumping in each of the mapped groundwater withdrawal locations for cannabis cultivation and residential use. Streamflow depletion is challenging to quantify (Barlow and Leake 2012) and no known measurements exist within the watershed for validation. Furthermore, since we do not know the year at which pumping began for each withdrawal point, we are not intending to reproduce historical or project future streamflow depletion patterns, but rather evaluate the magnitude of streamflow depletion for different pumping timescales caused by current groundwater use. The output of the analytical depletion function was the streamflow depletion caused by each well in each stream segment within our domain, which we compared to average baseflow over the past 20 water years separated using the Nathan and McMahon (1990) digital filter to evaluate impacts relative to current hydrologic conditions.

For well-scale impacts, we evaluated whether some cannabis cultivation parcels contributed disproportionately to depletion by ranking the total depletion caused by each well across all stream segments in September after 1, 10, and 50 years of pumping. We then quantified the factors which drove impacts at the well-scale using R^2 partitioning (Lindeman *et al* 1979) as implemented in the relaimpo package for R (Grömping 2006). Specifically, for each year tested (1, 10, 50 years), we built a multiple linear regression model predicting a well's total capture fraction as a function of annual water use, distance to closest stream segment, effective transmissivity between the well and the closest stream segment, streambed conductance of the closest stream segment, and the depth to bedrock at the well. We then used ANOVA to identify significant predictors ($p < 0.05$) of depletion at each timestep and evaluated the relative contribution of each significant predictor to the total R^2. We used a 1000-sample bootstrapping approach to generate mean and confidence intervals for the relative importance of each significant predictor variable.

For stream segment-scale impacts, we focused on streams with high ecological value (section 2.1.2). Following Feinstein *et al* (2016), we designed a grid of synthetic pumping wells at 1 km spacing ($n = 787$; figure S2) which we tested one-at-a-time using the mean monthly pumping schedule from all cannabis cultivation sites to simulate the impacts of pumping for 1, 10, and 50 years. These synthetic wells are meant to test pumping impacts on streamflow in a systematic manner throughout the entire domain and do not necessarily represent locations where pumping is currently occurring. We then summed the impacts from each well on streams of high ecological value and interpolated results to 150m resolution using inverse distance weighted interpolation as implemented in the gstat package for R (Gräler *et al* 2016) to map the spatial distribution of potential impacts

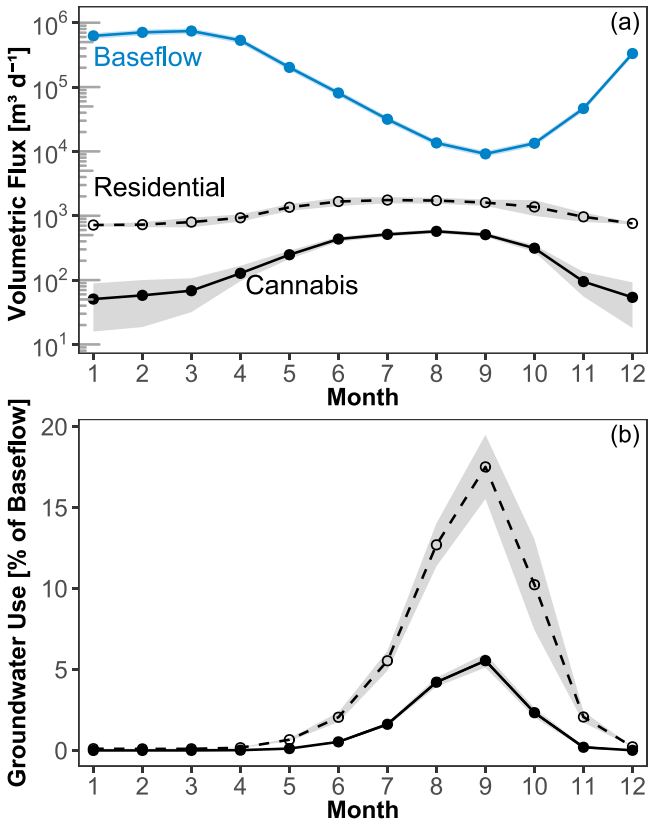

Figure 3. Estimated monthly cannabis and residential groundwater use, shown (a) as a volume and (b) as a percentage of mean monthly baseflow (1999–2018 water years). Shaded ribbon show +/−1 standard deviation of estimated water use.

on high ecological value streams. To determine the distance from a stream at which effects are greatest, we created buffers of 100–3000 m at an interval of 100 m around each high-value stream segment. Within each of these buffers, we averaged the values within this distance of the stream from the interpolated rasters. To identify the distance at which impacts of pumping begin to increase non-linearly, we identify the maximum of the second derivative of a smoothed relationship between depletion from high potential streams and buffer distance surrounding each high-potential stream.

3. Results and discussion

3.1. Cannabis and residential groundwater use

Both cannabis and residential properties use substantial amounts of groundwater with strong seasonality in estimated groundwater abstraction. Groundwater use for cannabis production within the Navarro River Watershed is minimal in the wet winter months and peaks in August at 572 m^3 d^{-1} (figure 3(a)), and estimated annual abstractions total 92,945 m^3. Residential groundwater use has a similar seasonal pattern but a much greater magnitude, peaking in July at 1753 m^3 d^{-1} (figure 3(a)). The lowest residential water use month (January) has greater groundwater withdrawals than the highest cannabis water use month, and total annual abstractions for residential use (437,786 m^3) are 4.7 times greater than abstractions for cannabis. As a percentage of baseflow, both cannabis and residential groundwater use is highest in September at 5.5% and 17.5% of mean monthly baseflow, respectively (figure 3(b)). This is the month where baseflow is lowest, affected by a significant decreasing trend, and most important for salmon habitat (figure 1).

The larger groundwater use by residential properties is driven by two factors which vary seasonally. In the summer, overall residential use is higher than cannabis use even though cannabis has a higher per-well abstraction rate because there are more residential pumping locations in the watershed than groundwater-irrigated cannabis cultivation sites (1314 residential structures compared to 302 cannabis parcels using groundwater). If the number of cannabis parcels increased to match the number of residential structures, groundwater abstraction for cannabis would exceed residential use for June-September. In the winter, residential water use is greater than that of cannabis because cannabis water use is negligible outside of the summer growing season, while residential properties have ongoing water use during the winter months due to

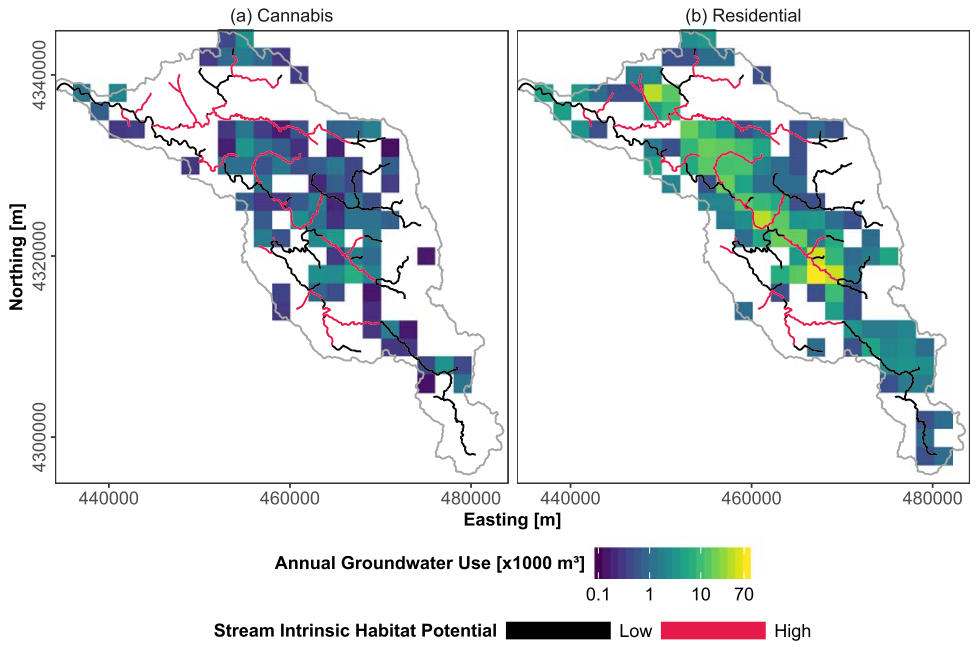

Figure 4. Map of intrinsic habitat potential for coho salmon within the Navarro River Watershed, with estimated annual (a) cannabis and (b) residential groundwater use (aggregated from points to 2km resolution to protect individual privacy). White areas within the watershed boundary have no estimated groundwater use. Habitat potential for steelhead salmon are shown in figures S3–S5.

climate-insensitive indoor water requirements such as cooking and cleaning (Gato *et al* 2007, Breyer *et al* 2012, Zipper *et al* 2017).

Spatially, residential groundwater use is more clustered along the river than cannabis groundwater use, including many streams with high salmonid habitat potential (figure 4). The spatial distribution of residential use corresponds with the locations of most of the towns in the flatlands along the Navarro River (e.g., Boonville, Philo, Navarro). Cannabis cultivation is much more diffuse within the watershed, primarily concentrated in the middle reaches of the watershed (figure 4(a); Butsic *et al* 2017, Butsic *et al* 2018).

3.2. Watershed scale impacts

Streamflow depletion associated with both cannabis and residential groundwater use (figure 5) follows a similar seasonal pattern to water withdrawals (figure 3), with a slight time lag due to the delay between groundwater pumping and streamflow depletion. Streamflow depletion associated with cannabis production is largest in September both volumetrically (figure 5(a); 93, 139, and 176 $m^3\ d^{-1}$ after 1, 10, and 50 years of pumping respectively) and as a percentage of monthly baseflow (figure 5(b); 1.0%, 1.5%, and 1.9% after 1, 10, and 50 years of pumping respectively) over our entire study period. This is offset from the month of peak water use, which is August (figure 3(a)). Peak monthly streamflow depletion associated with residential groundwater use is substantially larger than that of cannabis (figure 5(a)), at 485 $m^3\ d^{-1}$ after 1 year (5.2x greater than cannabis), 700 $m^3\ d^{-1}$ after 10 years (5.0× greater), and 854 $m^3\ d^{-1}$ after 50 years (4.9x greater). Like cannabis, the impacts are largest relative to baseflow in September (5.3% after 1 year, 7.6% after 10 years, and 9.3% after 50 years) which is when baseflow is lowest and the primary component of streamflow (figure 5(b)). These impacts approach the presumptive standard of 10% of monthly baseflow which is suggested to sustain aquatic ecosystems (Gleeson and Richter 2018).

The degree to which streamflow depletion caused by cannabis or residential pumping may affect aquatic ecosystems is a function of the streamflow in a given year, which is driven by interannual weather variability. For example, in a dry or average year, reductions in flow caused by groundwater pumping are occurring during a time in which flow is already below the state aquatic baseflow standard (figures 6(a)–(b)), which is defined by the California Cannabis Cultivation Policy as median August flow over the period of record (CA State Water Resources Control Board 2017). In contrast, during a wet year, streamflow remains greater than the aquatic baseflow standard even when potential pumping impacts are considered (figure 6(c)). During the period of record, there were five years (1951, 1996, 1997, 2003, and 2011) in which baseflow would have dropped below the aquatic baseflow standard if additional pumping equal to the present rates occurred for one year prior, indicating that managing the impacts of streamflow depletion may be most critical when flow is near aquatic ecosystem thresholds.

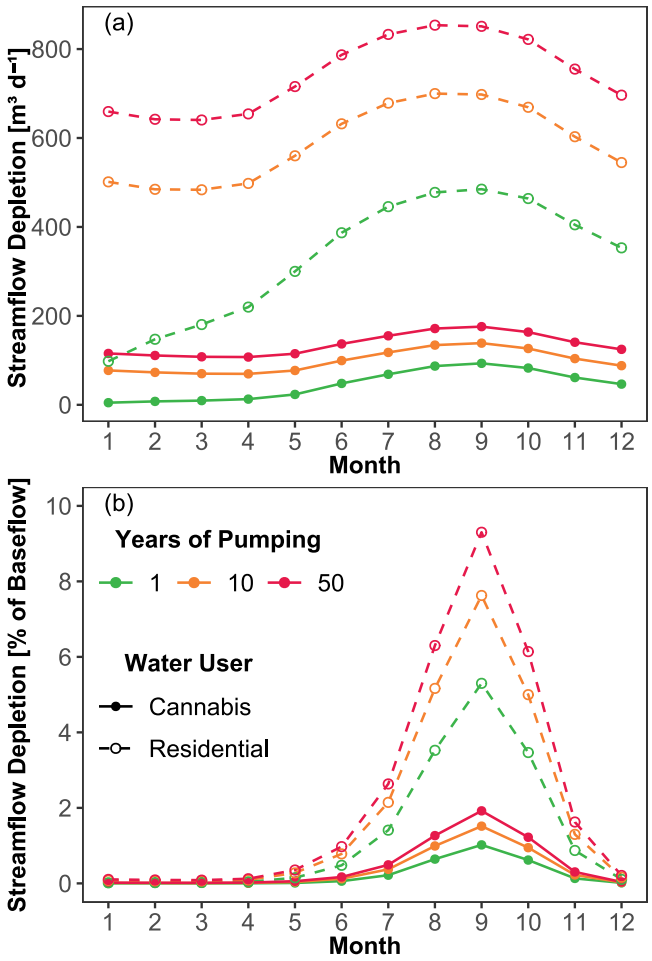

Figure 5. Streamflow depletion (within the Navarro River Watershed only) caused by groundwater pumping for cannabis cultivation and residential use after 1, 10, and 50 years of pumping, expressed (a) volumetrically and (b) as a percentage of mean monthly baseflow (1999–2018 water years).

Since historical data about the onset of pumping is not available, we are not able to attribute either long-term trends in baseflow (figure 1) or specific exceedance events (figure 6) to historical cannabis cultivation activities, residential development, or other factors such as climate change. However, our results show that a sizeable portion of impacts occur shortly after the onset of pumping. For example, 52.8% and 56.8% of long-term (50 year) depletion in September is already present the year pumping begins for cannabis and residential use, respectively (figure 5). Since the recovery from depletion occurs as an inverse of the timescale of depletion impacts (Jenkins 1968, Barlow and Leake 2012), this indicates that the hydrological system is highly sensitive to potential new pumping impacts, but also may recover quickly if pumping is reduced or halted in certain areas.

3.3. Well scale impacts

Our well-scale assessment of cannabis impacts indicates that a relatively small number of wells have a disproportionate impact on overall watershed-scale depletion. After 1 year of pumping, 50% of the depletion in the Navarro River Watershed can be attributed to only 32 wells (10.6% of estimated groundwater pumping wells in the Navarro; figure 7(a)). After 10 and 50 years, the number of wells causing 50% of depletion increases to 53 (17.5%) and 72 (23.8%), respectively (figure 7(a)). In year 1, only ~50% of well locations have any appreciable depletion (figure 7(a)). These results lend support to targeted conservation measures and the importance of well location, as removing or reducing pumping rates from a small subset of wells could have outsize environmental benefits, particularly at short timescales (e.g., within a single year).

Water use, distance from the well to the closest stream, and the effective transmissivity between a well and the closest stream are the primary predictors of the amount of depletion caused by a well, while streambed conductance and depth to bedrock at the well were not significant predictors. The relative importance of predictors changes through time, indicating shifting drivers of variability in capture fraction at different timescales. The predictive skill of water use increases through time, which is partially counteracted by a decrease

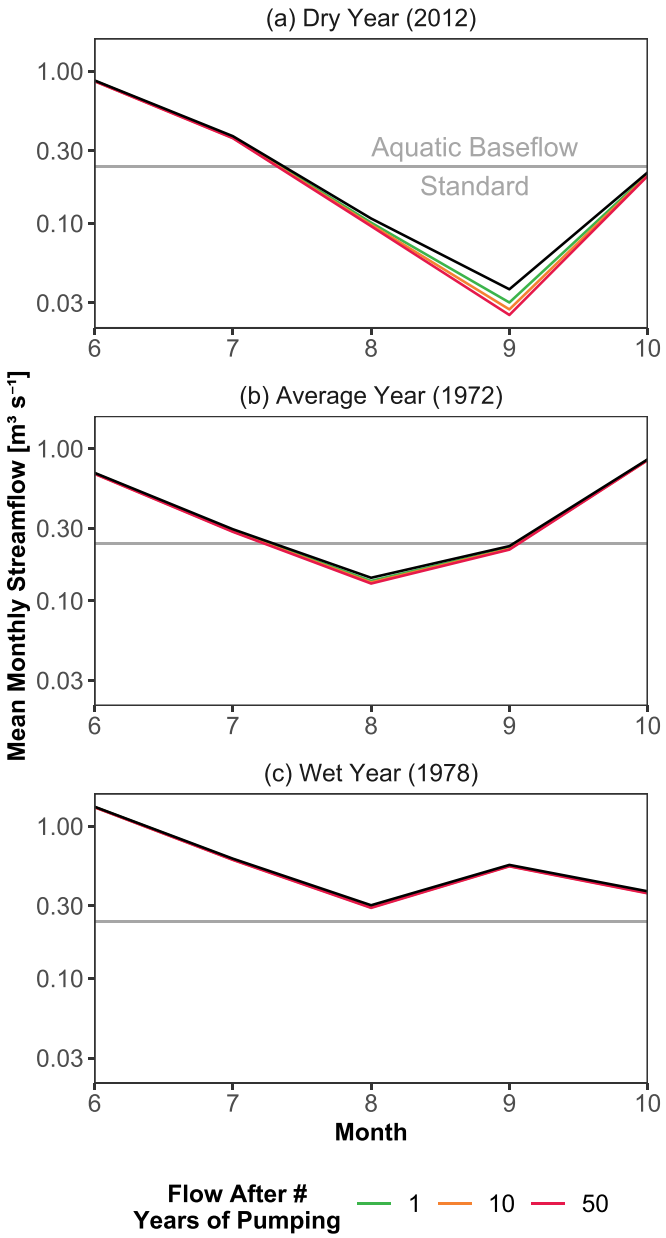

Figure 6. Measured streamflow (black line) and streamflow remaining after 1, 10, and 50 years of depletion (colored lines) from combined cannabis and residential pumping, shown relative to monthly flow in (a) a dry year, 2012, (b) an average year, 1972, and (c) a wet year, 1978. The gray horizontal lines shows the aquatic baseflow standard for the Navarro River from the California Cannabis Cultivation Policy, which is defined as the median August flow over the period of record (CA State Water Resources Control Board 2017). Note log-scale on y-axis.

in the predictive power of transmissivity. The decrease in the importance of transmissivity through time is indicative of the system coming to a new dynamic equilibrium of the source of water to the wells, which is relatively insensitive to hydrogeological properties (Zipper *et al* 2019a, Barlow and Leake 2012). While our conceptual model assumed two homogeneous layers, the decreasing importance of transmissivity through time would likely be true even with heterogeneous hydrostratigraphy because the decreasing predictive power of transmissivity results from the transition from groundwater depletion to streamflow depletion as the primary source of water to wells (Barlow and Leake 2012). In contrast, distance to the closest stream has relatively steady predictive skill in all years, indicating that this may be a consistently useful predictor across all timescales.

3.4. Stream segment scale impacts

Due to the large importance of the well-stream distance (section 3.3), pumping close to stream segments with high habitat potential has the largest potential negative environmental impacts. All else being equal, streamflow depletion would have larger negative impacts in smaller stream segments with lower flow. Portions of the landscape with strong effects on high potential stream segments include much of the middle reaches of the

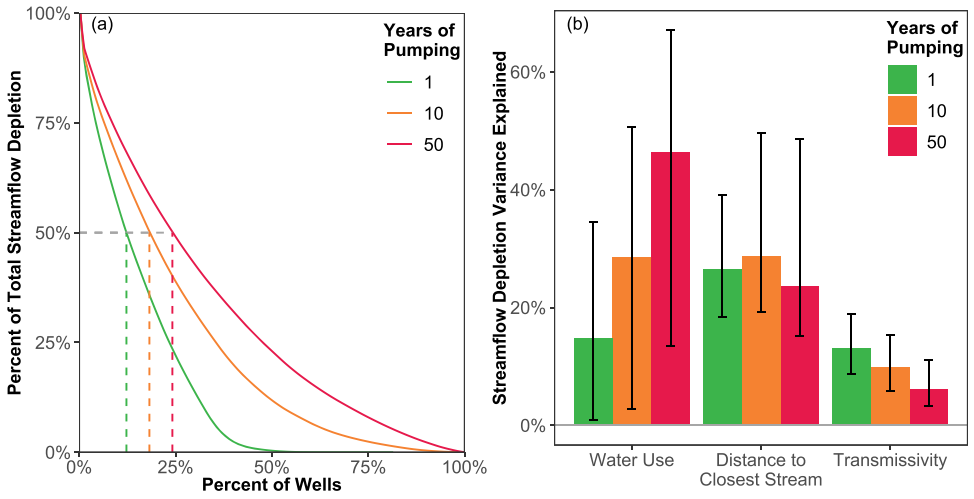

Figure 7. (a) Cumulative distribution functions of the total streamflow depletion accounted for as a function of the percentage of total groundwater pumping wells in September of year 1, 10, and 50 of pumping scenarios. Dashed lines annotate the percent of wells accounting for 50% of the total streamflow depletion at each time interval. (b) Relative importance of significant predictors for predicting cumulative streamflow depletion caused by a well across all stream segments in September of year 1, 10, and 50. Water use is annual estimated pumping rate for that well [$m^3\ yr^{-1}$] and transmissivity is the bulk transmissivity between the well and the closest stream [$m^2\ d^{-1}$]. Bars show mean and errorbars show 95% confidence interval from 1000-sample bootstrap.

Navarro River (figures 8(a)–(c)) which is coincident with locations where significant groundwater use occurs for residential structures (figure 4(b)) and, to a lesser degree, cannabis cultivation (figure 4(a)). While the portion of the landscape where pumping harms high potential streams expands through time, across the entire study period there is a nonlinear increase in depletion caused by wells within 1.2 km of a stream segment (figures 8(d)–(f); S6), indicating that a distance of 1.2 km of high potential stream segments may be a critical threshold for management for both short-term and long-term sustainability, especially near headwater streams. Wells which are screened in alluvial materials tend to have the largest impact on high-potential streams (figures 8(d)–(f)), indicating that the magnitude and timing of these impacts may be sensitive to estimates of alluvial hydrostratigraphic properties. Since the alluvial sediment is thickest in low-lying areas along the stream valleys (figure S2), this likely contributes to the nonlinear increase in streamflow depletion for wells within 1.2 km of the stream.

3.5. Management implications

Our results show that there is likely significant streamflow depletion in streams with high habitat potential caused by both cannabis and residential groundwater use in the Navarro River Watershed, with shifting drivers of impacts and implications through time. Over half of the long-term streamflow depletion manifests within a single year of the start of our pumping simulations (figure 5), and impacts at short timescales is most strongly influenced by the proximity of a well to a stream (figure 7) with nonlinearly increasing impacts within a distance of 1.2 km (figure 8). Over long timescales, the primary driver of impacts for a given well is the annual water use (figure 7), though impacts still increase nonlinearly within 1.2 km regardless of pumping rate (figure S6). While the exact timing and quantity of streamflow depletion may vary locally with refined estimates of hydrostratigraphic properties or more precise pumping schedules, our results broadly show the relative importance of cannabis and residential groundwater use within a year and across decades.

This suggests that the area within 1.2 km of the stream network is a critical management area (figure 9). Overall, 233 of the 302 parcels (77%) predicted to use groundwater for cannabis cultivation are within 1.2 km of a stream segment, and these parcels are more frequently close to stream segments with high habitat potential than not (figure 9(b)). Residential groundwater use is also frequently close to streams, with 89% of residential groundwater use within 1.2 km of any stream and 67% of residential groundwater use near a high habitat potential stream (figure 9(c)). While our results focused primarily on cannabis, our approach could be used to quantify impacts of groundwater withdrawals for other reasons. As cannabis cultivation expands in the region, its impacts will be an additional stress on top of ongoing residential groundwater use and direct surface water withdrawals for traditional agriculture. Total surface water withdrawals for traditional agriculture within the Navarro River Watershed were estimated in 2009 as approximately $2 \times 10^6\ m^3\ yr^{-1}$ (McGourty *et al* 2013), which exceeds combined cannabis and residential groundwater abstractions estimated here by a factor of 4.

More broadly, we find that analytical depletion functions are a useful tool for screening-level assessments of groundwater pumping impacts on streams. The ongoing legalization of cannabis will require new and revised

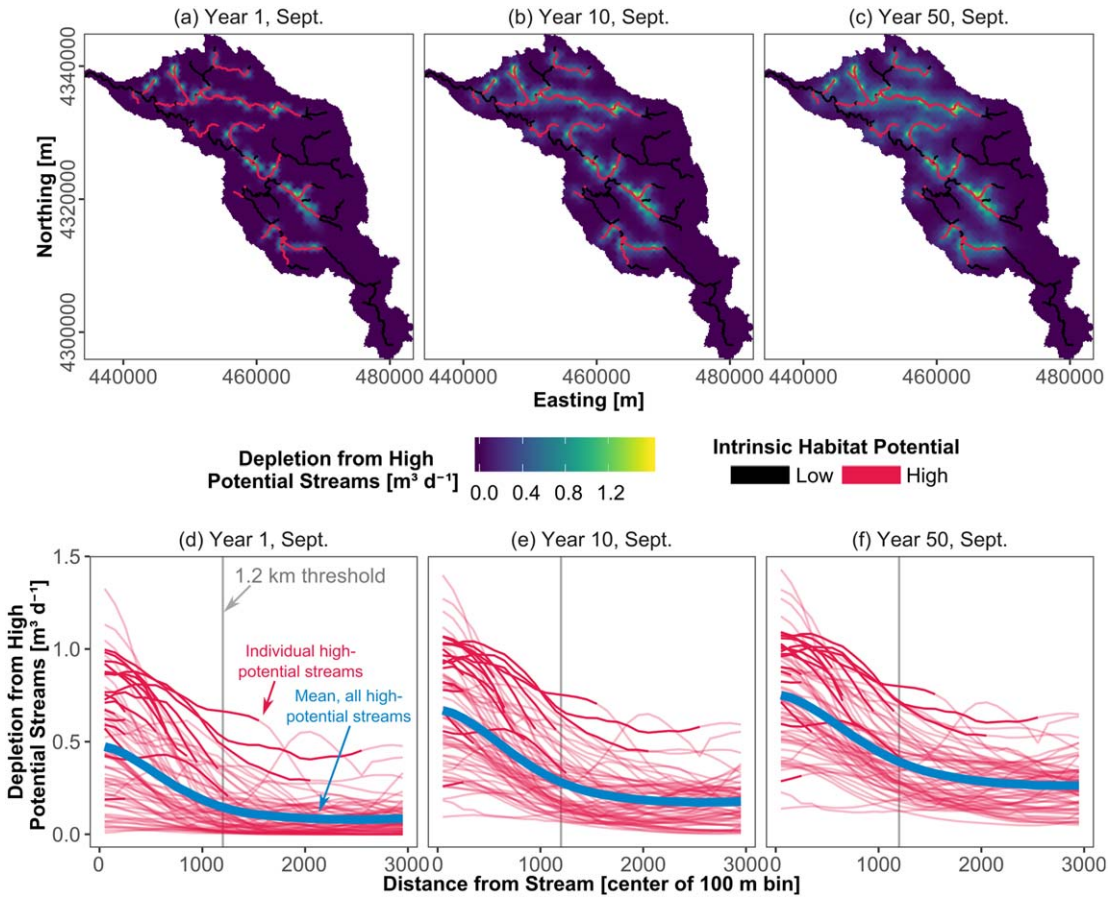

Figure 8 (a)–(c) Volumetric streamflow depletion that would occur from stream segments with high intrinsic habitat potential after 1, 10, and 50 years of pumping for an average cannabis cultivation site at different locations on the landscape. (d)–(f) Mean streamflow depletion from high intrinsic habitat potential streams as a function of distance from the stream; each red line corresponds to a high potential stream segment, and the blue line is the mean of all high potential segments. Dark red lines indicate distances in which wells are screened all or partly in alluvial materials. The vertical gray line indicates the critical 1.2 km distance within which impacts increase nonlinearly (section 3.4).

regulations to protect water and other environmental resources; in the USA, these protections will likely manifest at the local level due to a lack of federal regulation (Owley 2017, Short Gianotti *et al* 2017). Given the paucity of subsurface data available in most watersheds, the rapidity with which cannabis production is expanding (Butsic *et al* 2018), and the local scope at which cannabis is likely to be managed (Owley 2017), it is essential to provide accurate decision support resources with minimal time, data, and computational requirements. We show that analytical depletion functions can identify areas of potential concern for groundwater pumping (e.g., figures 8, 9) which could be used to flag groundwater withdrawal locations for further investigation or targeted conservation measures. Due to the low computational requirements relative to numerical models, analytical approaches are well-suited for integration into decision support tools (Reeves *et al* 2009, Huggins *et al* 2018, Colorado Alluvial Water Accounting System), and analytical depletion functions help overcome many of the limitations identified previously for standalone analytical models such as the inability to simulate multiple and/or sinuous streams.

4. Conclusions

In this study, we evaluate and contextualize the potential impacts of cannabis groundwater use at the watershed, well, and stream segment scales in the Navarro River Watershed (California, USA). We find that cannabis pumping has an important impact on streamflow during the dry season but is dwarfed by streamflow depletion caused by residential groundwater use which is 5x greater. However, cannabis pumping can be considered a new and expanding source of groundwater depletion which will further deplete summer baseflow already stressed by residential water use and traditional agriculture. At the well scale, we find that a small number of wells contribute disproportionately to streamflow depletion, particularly over short timescales; and that relatively easy-to-obtain input data (annual water use and distance to stream) are the primary factors related to pumping impacts on streamflow, with increasing importance of water use through time. Subsurface properties such as transmissivity are most important shortly after

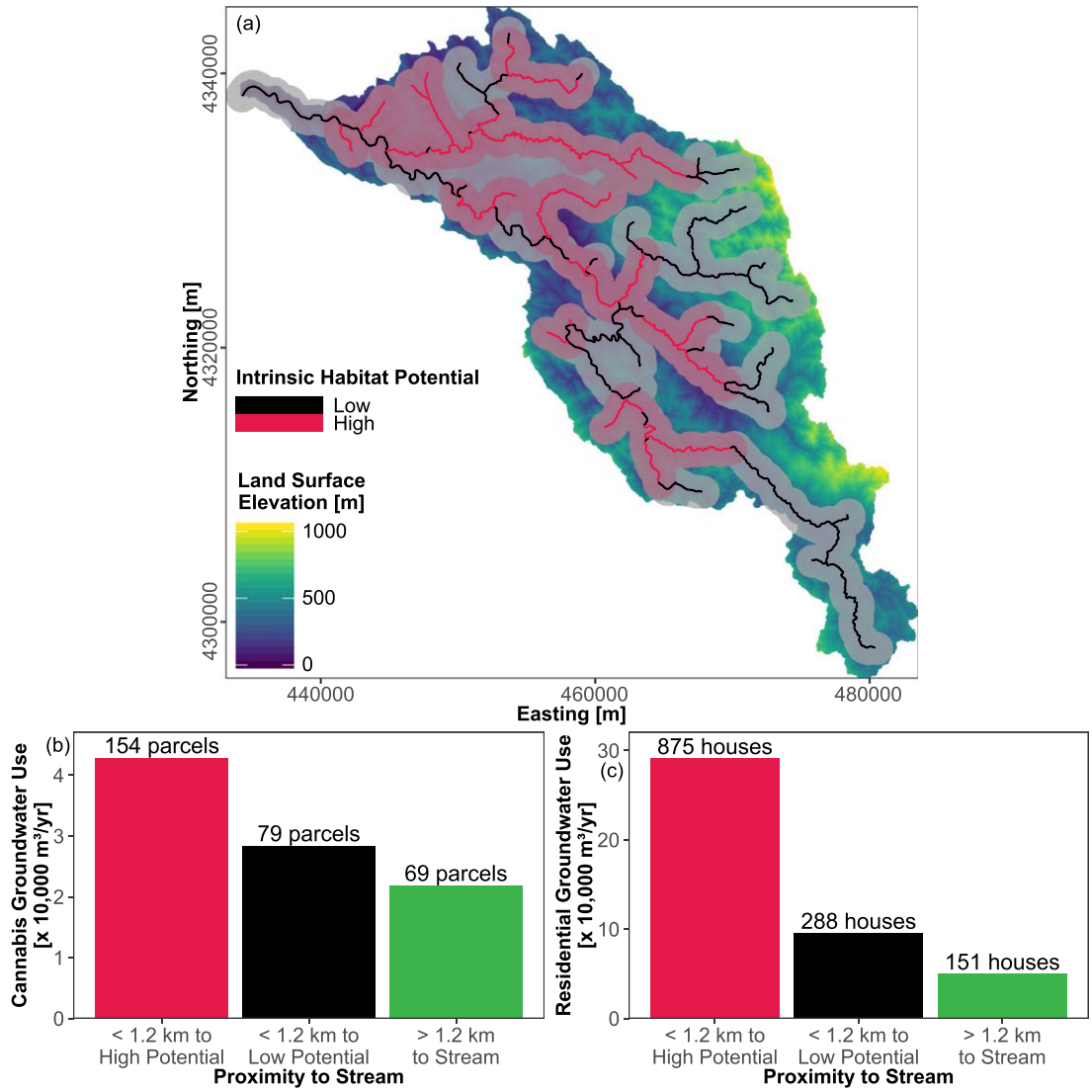

Figure 9. (a) Map showing areas within 1.2 km of stream segments with high intrinsic habitat potential (red line with red buffer) and low intrinsic habitat potential (black line with gray buffer), which was identified as a critical distance threshold for pumping impacts (figure 8, figure S6). (b), (c) Estimated annual groundwater pumping for (b) cannabis irrigation and (c) residential use occurring within 1.2 km of a high potential stream segment, within 1.2 km of a low potential stream segment, and further than 1.2 km from a stream. Note that (b) and (c) have different y-axes.

the onset of pumping and decrease in importance through time. We also show that pumping within a threshold of 1.2 km of sensitive stream segments has a disproportionately high impact, particularly at short (annual to decadal) timescales. Overall, these results indicate that the emerging cannabis agricultural frontier is likely to increase stress on both surface water and groundwater resources and groundwater-dependent ecosystems, particularly in areas already stressed by other groundwater users.

Acknowledgments and Data

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RESEARCH ARTICLE

Impacts of Surface Water Diversions for Marijuana Cultivation on Aquatic Habitat in Four Northwestern California Watersheds

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Data Availability Statement: Most data used are available via public sources (USGS gage data, EWRIMS, and Google Earth), but specific spatial locations of marijuana grows cannot be shared due to legal and privacy concerns. Summary data and all methods/information needed to replicate the study are included in the manuscript. Plant counts and greenhouse counts and measurements for all watersheds are included as Supporting Information (excel spreadsheets).

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Abstract

Marijuana (*Cannabis sativa* L.) cultivation has proliferated in northwestern California since at least the mid-1990s. The environmental impacts associated with marijuana cultivation appear substantial, yet have been difficult to quantify, in part because cultivation is clandestine and often occurs on private property. To evaluate the impacts of water diversions at a watershed scale, we interpreted high-resolution aerial imagery to estimate the number of marijuana plants being cultivated in four watersheds in northwestern California, USA. Low-altitude aircraft flights and search warrants executed with law enforcement at cultivation sites in the region helped to validate assumptions used in aerial imagery interpretation. We estimated the water demand of marijuana irrigation and the potential effects water diversions could have on stream flow in the study watersheds. Our results indicate that water demand for marijuana cultivation has the potential to divert substantial portions of streamflow in the study watersheds, with an estimated flow reduction of up to 23% of the annual seven-day low flow in the least impacted of the study watersheds. Estimates from the other study watersheds indicate that water demand for marijuana cultivation exceeds streamflow during the low-flow period. In the most impacted study watersheds, diminished streamflow is likely to have lethal or sub-lethal effects on state-and federally-listed salmon and steelhead trout and to cause further decline of sensitive amphibian species.

Introduction

Marijuana has been cultivated in the backwoods and backyards of northern California at least since the countercultural movement of the 1960s with few documented environmental impacts [1]. Recent increases in the number and size of marijuana cultivation sites (MCSs) appear to be, in part, a response to ballot Proposition 215, the Compassionate Use Act (1996). This California law provides for the legal use and cultivation of medical marijuana. In 2003, legislation was passed in an attempt to limit the amount of medical marijuana a patient can possess or

Competing Interests: The authors have declared that no competing interests exist.

cultivate (California State Senate Bill 420). However, this legislation was struck down by a 2010 California Supreme Court decision (*People v. Kelly*). As a result of Proposition 215 and the subsequent Supreme Court ruling, the widespread and largely unregulated cultivation of marijuana has increased rapidly since the mid-1990s in remote forested areas throughout California [2]. California is consistently ranked highest of all states for the number of outdoor marijuana plants eradicated by law enforcement: from 2008–2012 the total number of outdoor marijuana plants eradicated in California has ranged from 53% to 74% of the total plants eradicated in the United States [3]. In spite of state-wide prevalence, there is not yet a clear regulatory framework for the cultivation of marijuana, and from an economic viewpoint there is little distinction between plants grown for the black market and those grown for legitimate medical use [4].

Northwestern California has been viewed as an ideal location for marijuana cultivation because it is remote, primarily forested, and sparsely populated. Humboldt, Mendocino, and Trinity Counties, the three major counties known for marijuana cultivation in Northwestern California [5], comprise 7% (26,557 km^2) of the total land area of the state of California. However, their combined population of 235,781 accounts for only 0.62% of the state's total population (United States Census Data 2012). Humboldt County, with an area of 10,495 km^2, has over 7689 km^2 of forestland comprising more than 70% of its land base. More importantly, Humboldt County has 5,317 km^2 of private lands on over 8,000 parcels zoned for timber production [6]. This makes Humboldt County a feasible place to purchase small remote parcels of forestland for marijuana cultivation.

The broad array of impacts from marijuana cultivation on aquatic and terrestrial wildlife in California has only recently been documented by law enforcement, wildlife agencies, and researchers. These impacts include loss and fragmentation of sensitive habitats via illegal land clearing and logging; grading and burying of streams; delivery of sediment, nutrients, petroleum products, and pesticides into streams; surface water diversions for irrigation resulting in reduced flows and completely dewatered streams [2,7–10]; and mortality of terrestrial wildlife by rodenticide ingestion [11,12]. Though these impacts have been documented by state and federal agencies, the extent to which they affect sensitive fish and wildlife species and their habitat has not been quantified. These impacts have gained attention in recent years [7,9] because of the continuing prevalence of "trespass grows," illicit marijuana cultivation on public land. In comparison, the extent of cultivation and any associated environmental impacts on private lands are poorly understood, primarily because of limited access. In addition, state and local agencies lack the resources to address environmental impacts related to cultivation on private lands. In contrast with many MCSs on public lands, MCSs on private lands appear to be legal under state law, pursuant to Proposition 215. Regardless of the legal status of these MCSs, the water use associated with them has become an increasing concern for resource agencies [13].

California's Mediterranean climate provides negligible precipitation during the May—September growing season. In Northern California, 90–95% of precipitation falls between October and April [14]. Marijuana is a high water-use plant [2,15], consuming up to 22.7 liters of water per day. In comparison, the widely cultivated wine grape, also grown throughout much of Northwestern California, uses approximately 12.64 liters of water per day [16]. Given the lack of precipitation during the growing season, marijuana cultivation generally requires a substantial amount of irrigation water. Consequently, MCSs are often situated on land with reliable year-round surface water sources to provide for irrigation throughout the hot, dry summer growing season [7,8,12]. Diverting springs and headwater streams are some of the most common means for MCSs to acquire irrigation water, though the authors have also documented the use of groundwater wells and importing water by truck.

The impacts to aquatic ecosystems from large hydroelectric projects and other alterations of natural flow regimes have been well documented [17–20], but few studies have attempted to

quantify the impacts of low-volume surface water diversions on stream flows [21,22]. A study in the Russian River watershed in Sonoma County, CA, concluded that the demand of registered water diversions exceeded stream flows during certain periods of the year, though this study did not quantify unregistered diversions. In addition, this study indicates that these registered diversions have the potential to depress spring base flows and accelerate summer recession of flows [22]. We postulate that the widespread, increasing, and largely unregulated water demands for marijuana cultivation, in addition to existing domestic demands, are cumulatively considerable in many rural Northern California watersheds.

In northern California, unregulated marijuana cultivation often occurs in close proximity to habitat for sensitive aquatic species. Because of this proximity and the water demands associated with cultivation, we chose to focus on the cumulative impacts of low-volume surface water diversions associated with marijuana cultivation. We evaluate these water demands at a watershed scale to determine whether they could have substantial effects on streamflow during the summer low-flow period. In addition, we discuss which sensitive aquatic species are most likely to be impacted by stream diversions and describe the nature of these impacts.

Methods

Methods are presented for the following components of the study: study area selection, data collection, water use estimates, and hydrologic analysis. For the purposes of this study, a MCS is defined as any area where marijuana is grown, either outdoors or inside a greenhouse, based on our aerial image interpretation. Because marijuana cultivation is federally illegal, its scope and magnitude are difficult to measure precisely [2,4,23]. However, the authors have accompanied law enforcement on search warrants and site inspections to evaluate more than 40 MCSs in the Eel River watershed and other watersheds in northwestern California. During these site inspections the number, size, and arrangement of marijuana plants were recorded, as were the water sources, conveyance and storage methods. These on-the-ground verification data were used as the basis for identifying characteristics of MCSs from aerial images.

Study Areas

Four study watersheds were selected—Upper Redwood Creek, Salmon Creek, and Redwood Creek South, located in Humboldt County; and Outlet Creek, located in Mendocino County (Figs. 1–4). Study watersheds were selected using the following criteria: (1) they are dominated by privately owned forestlands and marijuana cultivation is widespread within their boundaries as verified by low altitude survey flights and aerial imagery. (2) The primary watercourse, or downstream receiving body, has documented populations of sensitive aquatic species, such as coho salmon (*Oncorhynchus kisutch*). (3) Watersheds are of sufficient size so as to allow realistic population-scale and regional ecological relevance, but are not so large that conducting an analysis would be infeasible given limited staffing resources. (4) Streams in the watershed had either a flow gage, or nearby streams were gaged, which would allow proxy modeling of the low-flow period in the study watershed.

Habitat

The study watersheds are dominated by a matrix of open to closed-canopy mixed evergreen and mixed conifer forests with occasional grassland openings. Dominant forest stands include Tanoak (*Notholithocarpus densiflorus*) and Douglas-fir (*Pseudotsuga menziesii*) Forest Alliances ("Alliance" is a vegetation classification unit that identifies one or more diagnostic species in the upper canopy layer that are indicative of habitat conditions) [24]. These forests are dominated by Douglas—fir, tanoak, madrone (*Arbutus menziesii*), big leaf maple (*Acer*

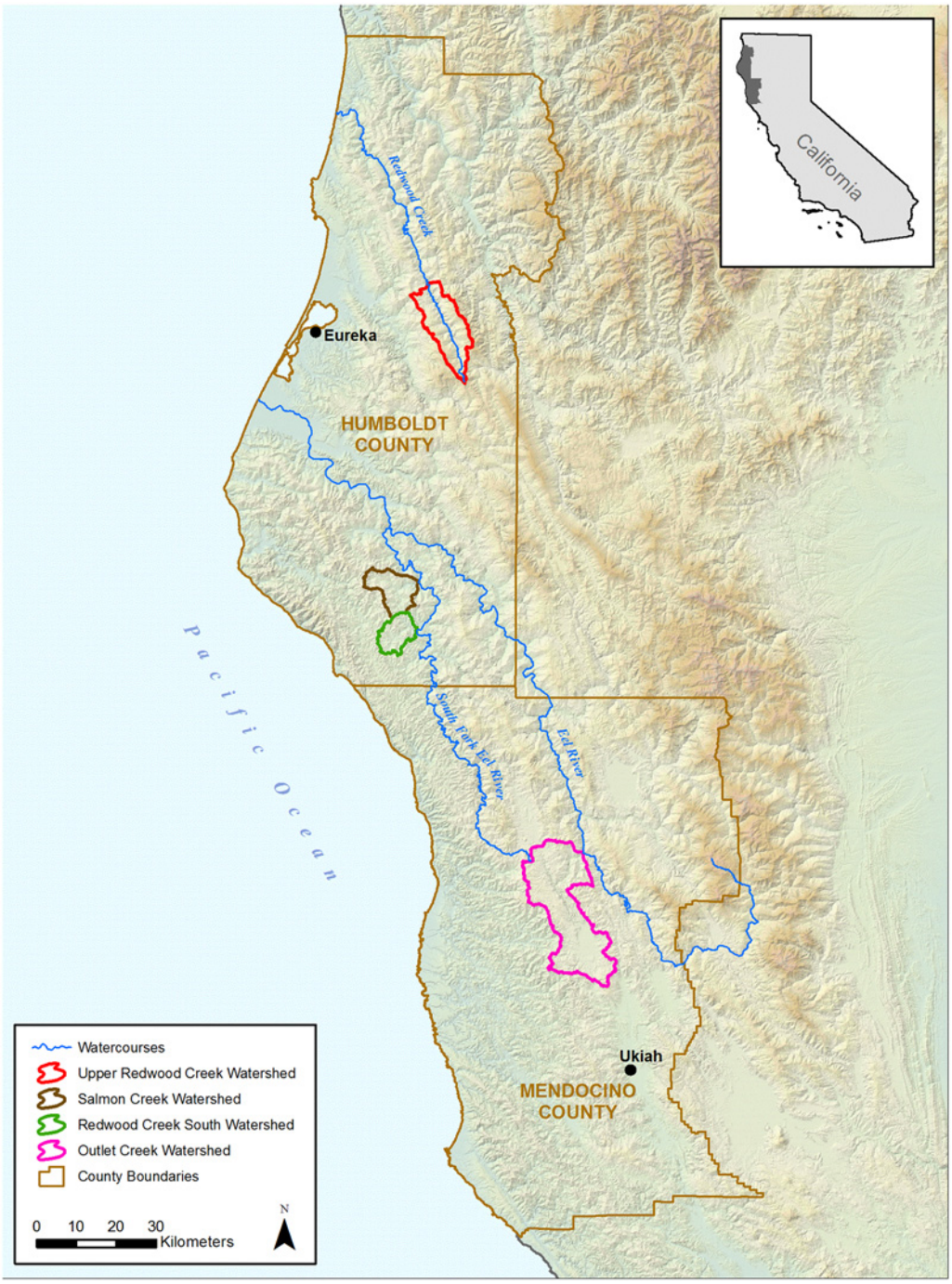

Fig 1. Study Watersheds and Major Watercourses.

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macrophyllum), and various oak species (*Quercus* spp.). The Redwood (*Sequoia sempervirens*) Forest Alliance, as described by Sawyer et al. [24] is dominant in areas of Upper Redwood Creek and in lower Salmon Creek and Redwood Creek South and includes many of the same dominant or subdominant species in the Tanoak and Douglas-fir Forest Alliances. These watersheds, a product of recent and on-going seismic uplift, are characterized as steep

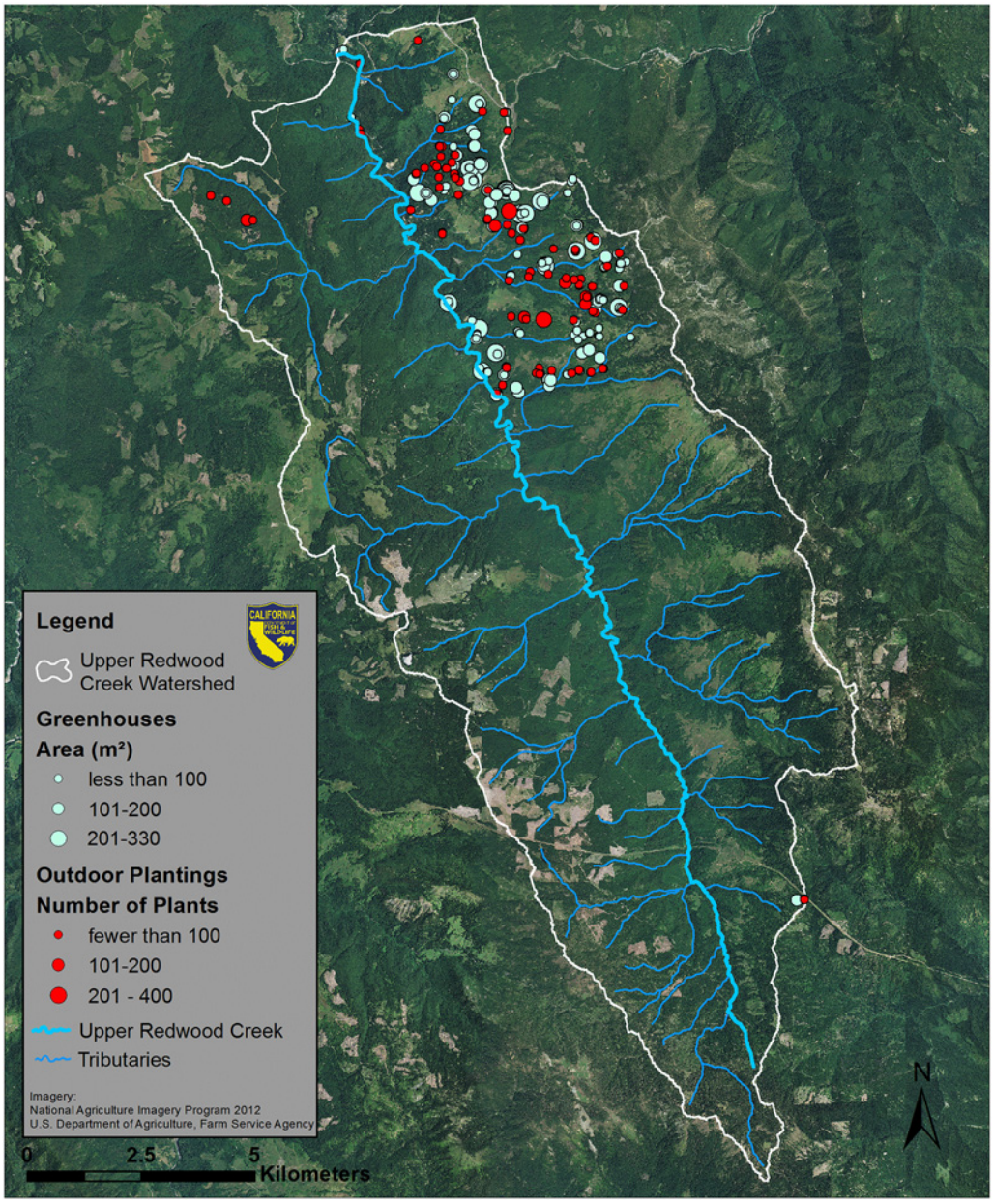

Fig 2. Upper Redwood Creek Watershed. Outdoor marijuana plantings are marked in red and greenhouses are marked in light green.

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mountainous terrain dissected by an extensive dendritic stream pattern, with the exception of Upper Redwood Creek, which has a linear trellised stream pattern [25].

Data Collection and Mapping Overview

Study watershed boundaries were modified from the Calwater 2.2.1 watershed map [26] using United States Geological Survey (USGS) 7.5 minute Digital Raster Graphic images to correct for hydrological inconsistencies. These watershed boundaries and a reference grid with one square kilometer (km^2) cells were used in Google Earth mapping program and ArcGIS (version 10.x, ESRI, Redlands, CA). Using Google Earth's high-resolution images of northern California

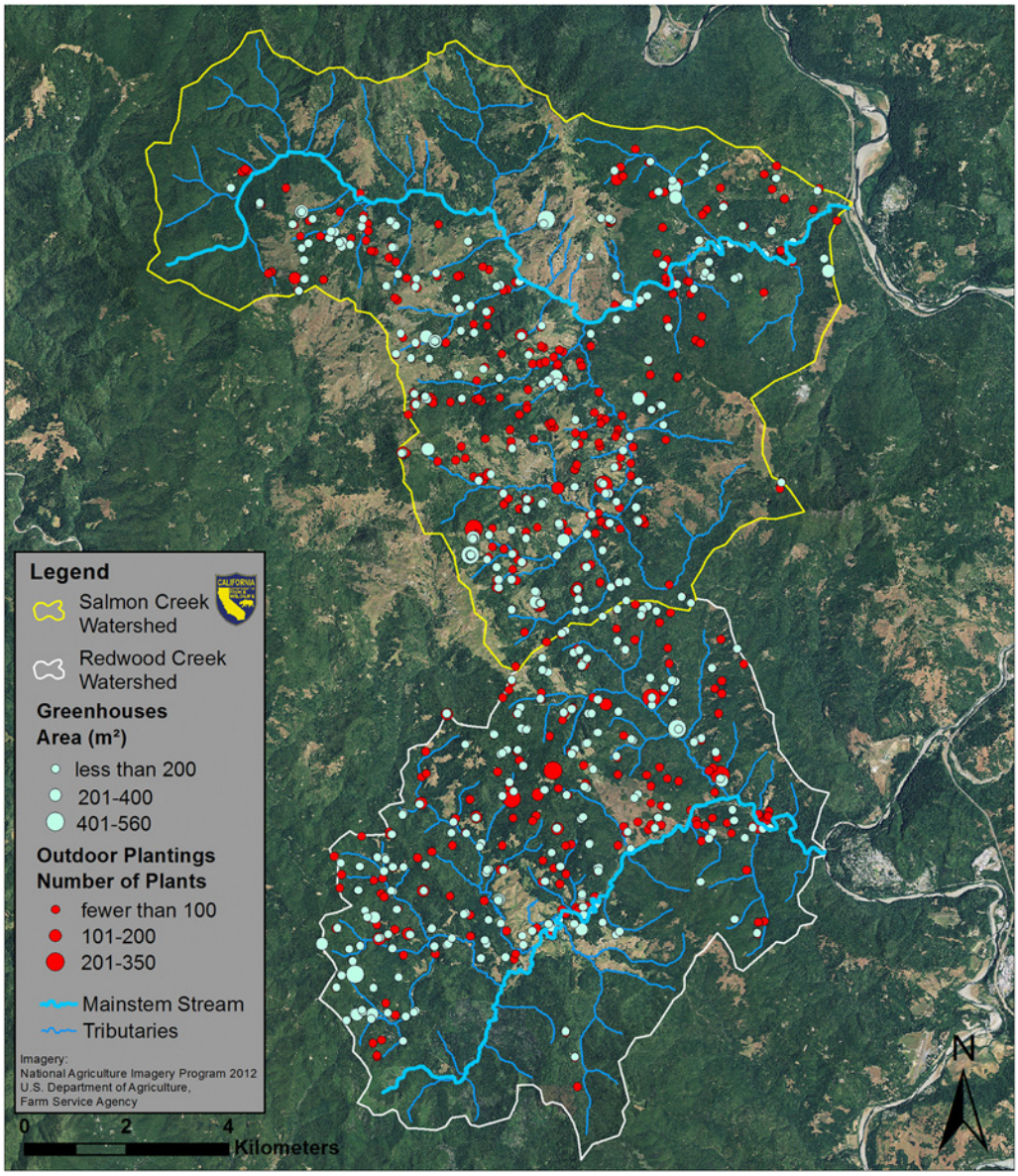

Fig 3. Salmon Creek and Redwood Creek South Watersheds. Outdoor marijuana plantings are marked in red and greenhouses are marked in light green.

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(image dates: 8/17/11, 7/9/12, and 8/23/12) as a reference, features of interest such as greenhouses and marijuana plants were mapped as points in ArcGIS. We identified greenhouses by color, transparency, elongated shape, and/or visible plastic or metal framework. Although we could not confirm the contents of greenhouses, the greenhouses we measured were generally associated with recent land clearing and other development associated with the cultivation of marijuana, as observed in our site inspections with law enforcement. Greenhouses clearly associated with only non-marijuana crop types, such as those in established farms with row crops, were excluded from our analysis. We identified outdoor marijuana plants by their shape, color, size and placement in rows or other regularly spaced configurations. We measured greenhouse lengths and widths using the Google Earth "Ruler" tool to obtain area, and counted and recorded the number of outdoor marijuana plants visible within each MCS. We also examined

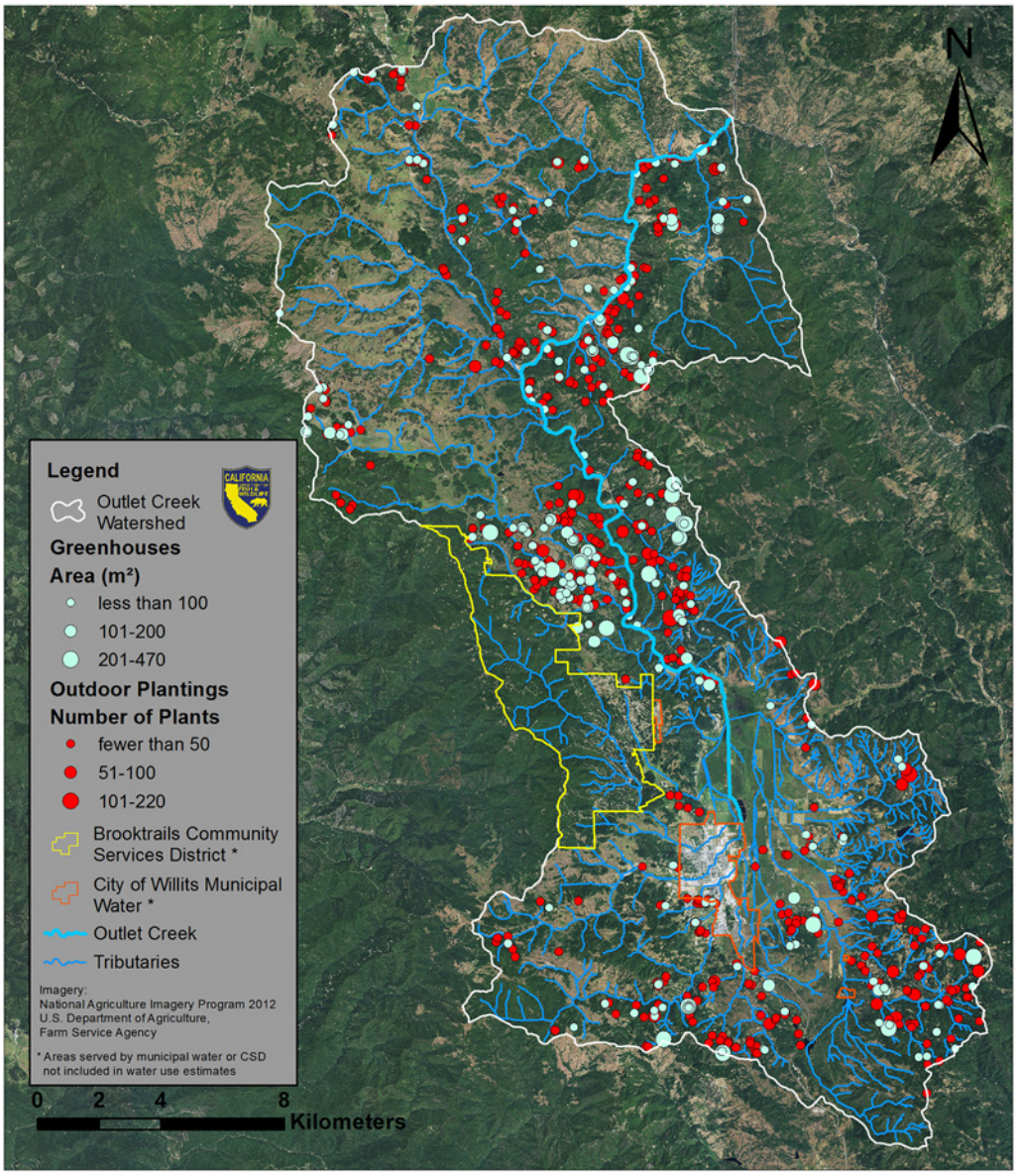

Fig 4. Outlet Creek Watershed. Outdoor marijuana plantings are marked in red and greenhouses are marked in light green.

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imagery from previous years using the Google Earth "Historical Imagery" tool to confirm that outdoor plants were not perennial crops, such as orchards.

Plant Abundance and Water Use Estimates

For each watershed, we totaled the number of marijuana plants that were grown outdoors and combined this value with an estimated number of marijuana plants in greenhouses to get a total number of plants per watershed. To develop a basis for estimating the number of marijuana plants in greenhouses, we quantified the spatial arrangement and area of marijuana plants in 32 greenhouses at eight different locations in four watersheds in Humboldt County while accompanying law enforcement in 2013. We calculated 1.115 square meters (m^2) per plant as an average spacing of marijuana plants contained within greenhouses. For the purposes of this

study, we assume that the average greenhouse area to plant ratio observed by the authors on law enforcement visits was representative of the average spacing used at MCSs in the study watersheds.

Our water demand estimates were based on calculations from the 2010 Humboldt County Outdoor Medical Cannabis Ordinance draft [27], which states that marijuana plants use an average of 22.7 liters per plant per day during the growing season, which typically extends from June-October (150 days). Water use data for marijuana cultivation are virtually nonexistent in the published literature, and both published and unpublished sources for this information vary greatly, from as low as 3.8 liters up to 56.8 liters per plant per day [7,28]. The 22.7 liter figure falls near the middle of this range, and was based on the soaker hose and emitter line watering methods used almost exclusively by the MCSs we have observed. Because these water demand estimates were used to evaluate impacts of surface water diversion from streams, we also excluded plants and greenhouses in areas served by municipal water districts (Outlet Creek, Fig. 4).

Hydrologic Analyses: Estimating Impacts on Summer Low Flows

The annual seven-day low flow, a metric often used to define the low flow of a stream, is defined as the lowest value of mean discharge computed over any seven consecutive days within a water year. This value varies from year to year. Annual seven-day low flow values for the ungaged watersheds in this study were estimated by correlating to nearby USGS gaged streams. Annual seven-day low flow values for Elder Creek (Fig. 5), a gage used for this correlation, demonstrate the year-to-year variability in the study watersheds. Elder Creek is considered to be the least disturbed of the gaged watersheds, and is also the smallest, with a contributing area of 16.8 square kilometers. The annual seven-day low flow estimates were made by scaling the gaged data by the ratio of average flow of the ungaged and gaged stream, a method that provides better estimates than scaling by watershed area [29]. Regression equations based on average annual precipitation and evapotranspiration were used to estimate average annual flow, providing a more unique flow characterization than using watershed area alone. These methods were developed by Rantz [30]. The gaged data were either from within the watershed of the study area or from a nearby watershed. Correlation with daily average flow data from a gaged

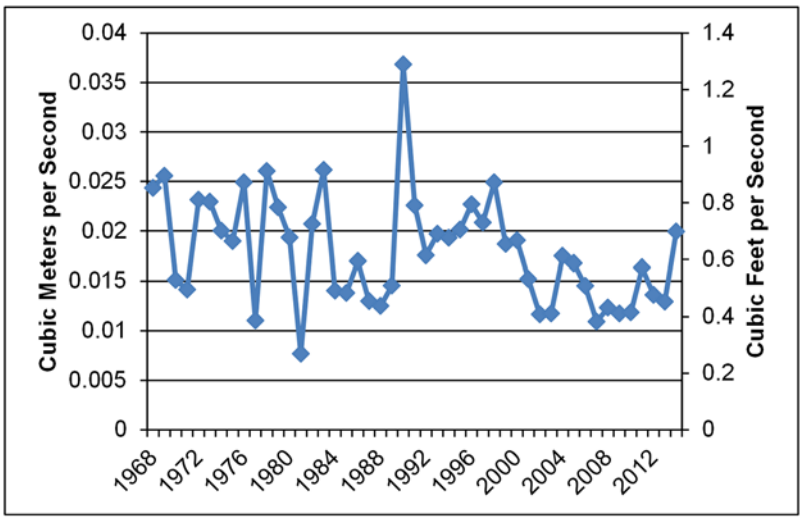

Fig 5. Elder Creek annual seven-day low flow. Values are shown for the period of record (water years 1968–2014).

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stream makes sense when the ungaged watershed is considered to be hydrologically similar to the gaged watershed, i.e. similar geology, vegetation, watershed size and orientation, and atmospheric conditions (precipitation, cloud cover, temperature). The accuracy of gaged data at low flows can be problematic because gaging very low flows is difficult and limited depending on the location of the gage and the precision in low-flow conditions, but the method can still provide a rough estimate of low flow by taking into account the range of uncertainty. Data were used from the closest most relevant gaged watershed for correlation to the ungaged sites.

Data for the gaged stations are shown in Table 1. This table includes the estimated average annual flow calculated from both the gaged data and also by use of the regression equations for comparison. The annual seven-day low flow for the period of record of each of the gaged stations is shown in Table 2. This table also shows the minimum, average, and maximum seven-day low flow values over the period of record as a way to represent the variability of the low flow from year to year. To estimate the annual seven-day low flow for the ungaged streams, the average annual seven-day low flow of the gaged stream was multiplied by the ratio of the annual average streamflow of the ungaged stream and the annual average streamflow of the gaged stream. A range of values, including the lowest and highest estimate for each location were calculated to represent the annual variability.

The mean annual streamflow of each ungaged stream was estimated using a regression equation, based on estimates of runoff and basin area developed by Rantz [30] (Equation 1). The mean annual runoff was estimated from a second regression equation (Equation 2) based on the relationship between mean annual precipitation and annual potential evapotranspiration for the California northern coastal area [30]. Mean annual precipitation values are from the USGS StreamStat web site (http://water.usgs.gov/osw/streamstats/california.html), which uses the PRISM average area weighted estimates based on data from 1971–2000. The estimates of mean annual evapotranspiration were taken from a chart produced by Kohler [31].

$$Q_{Avg} = 0.07362 = \left(\frac{m^3}{sec} \times yr \times cm \times km^2\right) \times R \times A \qquad \text{eq.(1)}$$

Table 1. USGS stream gages in or near study watersheds.

Watershed	Gage	Period of Record	Area (km^2)	MAP[a] (cm/yr)	PET[b] (cm/yr)	Mean Annual Runoff (cm/yr)	Q[c]avg (CMS[d]), predicted	Qavg (CMS), gaged	% difference
South Fork Eel River	USGS 11476500	10/1/1930–9/30/2012	1390.8	192.8	101.6	129.0	57.8	52.0	-11.1
Bull Creek	USGS 11476600	10/1/1967–9/30/2012	72.5	166.4	101.6	102.6	2.4	3.3	27.1
Elder Creek	USGS 11475560	10/1/1967–9/30/2012	16.8	215.9	101.6	152.1	0.8	0.7	-14.9
Outlet Creek	USGS 11472200	10/1/1956–9/30/1994	417.0	152.9	101.6	89.2	12.1	11.1	-8.8
Upper Redwood Creek	USGS 11481500	10/01/1953–10/1/2013	175.3	231.1	86.4	173.5	9.6	8.5	-12.6
Redwood Creek South	Ungaged	N/A	64.7	157.2	101.6	93.5	0.46	N/A	N/A
Salmon Creek	Ungaged	N/A	95.1	151.4	101.6	87.6	0.48	N/A	N/A

[a]mean annual precipitation

[b]potential evapotranspiration

[c]flow

[d]cubic meters per second

doi:10.1371/journal.pone.0120016.t001

Table 2. Annual seven-day low flow range for period of record.

Gage	Seven-day low flow for period of record in cubic meters per second		
	Minimum	Average	Maximum
SF Eel Miranda	0.3519	0.8829	1.796
Bull	0.0059	0.0310	0.0853
Elder	0.0076	0.0180	0.0368
Outlet Creek	0.0000	0.0162	0.0498
Upper Redwood Creek	0.0265	0.1064	0.2601
Redwood Creek South (based on Elder Creek)	0.004	0.010	0.021
Salmon Creek (based on Elder Creek)	0.005	0.011	0.022

doi:10.1371/journal.pone.0120016.t002

With

$$R = MAP - 0.4(PET) - 9.1$$

Where

$$Q_{Avg} = mean\ annual\ discharge\left(\frac{m^3}{sec}\right)$$

$$R = mean\ annual\ runoff\left(\frac{cm}{yr}\right)$$

$$A = drainage\ area(km^2)$$

$$MAP = mean\ annual\ precipitation\left(\frac{cm}{yr}\right)$$

$$PET = potential\ evapotranspiration\left(\frac{cm}{yr}\right)$$

Estimates of average annual flow made by using these equations range from-15% to +27% below and above the calculated value using the gaged daily average data (Table 1). The Bull Creek gage estimate produced the largest deviation of 27% and may be considered an outlier because of the known disturbances in the watershed due to historic logging practices, and USGS reported "poor" low flow data.

The mean annual flow for each ungaged watershed was calculated using the Rantz method described above. The mean annual precipitation and runoff values are shown in Table 1 with the predicted mean annual flow for the ungaged streams. The annual seven-day low flows for Upper Redwood Creek and Outlet Creek were calculated using data from their respective stream gages. For Redwood Creek South and Salmon Creek, both watersheds with no main-stem gage, the annual seven-day low flow was calculated in the same way by using the data from nearby gaged streams within the South Fork Eel watershed (Bull Creek, Elder Creek, and South Fork Eel near Miranda gage). Fig. 6 shows three different estimates of the duration curves of the annual seven-day low flow for the Redwood Creek South ungaged site based on the three different nearby gages. The variations between these estimated duration curves (Fig. 6) illustrate the relative variability of annual seven-day low flow. Reasons for this

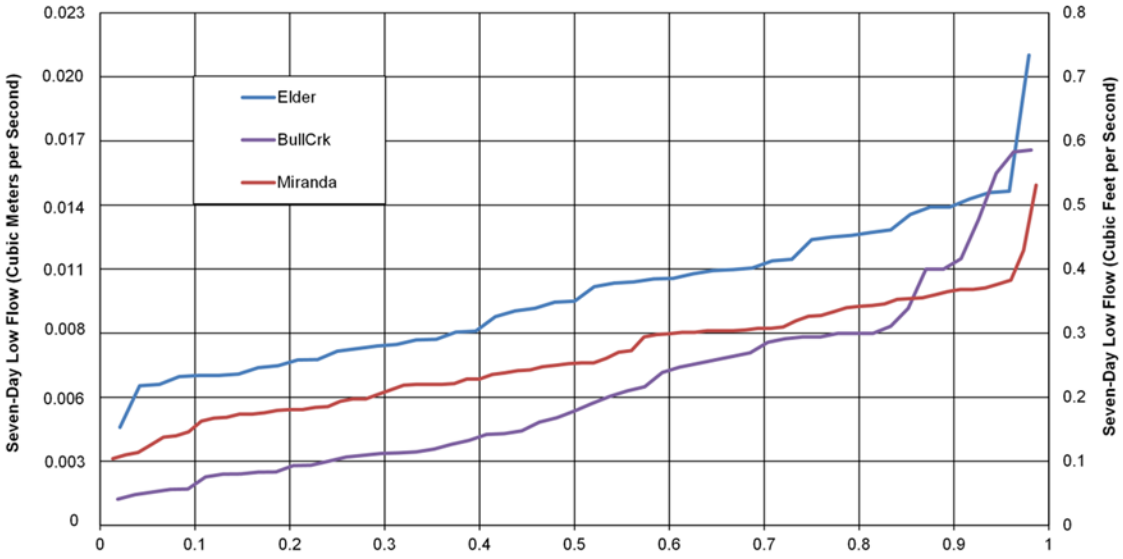

Fig 6. Duration curve of estimates of annual seven-day low flow for Redwood Creek South based on USGS data from nearby streams (Elder Creek, South Fork Eel at Miranda, and Bull Creek).

doi:10.1371/journal.pone.0120016.g006

variability may include the difference in hydrologic response of the gaged watersheds from the ungaged watersheds, differences in withdrawals or low flow measurement error, differences in the atmospheric patterns over the watershed, or differences in watershed characteristics (watershed size, orientation, land use, slope etc.). The gaged watersheds differed from the study watersheds in several ways, such as size (Miranda gage), disturbance (Bull Creek gage), and distance and orientation from the study watersheds (Elder Creek gage). Despite the differences, the Elder Creek gage most likely represents the best data set for correlation to the ungaged watersheds based on its similar size and relative unimpairment. The estimated values represent the upper limit of low flows for the ungaged streams, thus are conservative values and may be an overestimate.

Results

MCSs were widespread in all four study watersheds. In general, MCSs were clustered and were not evenly distributed throughout the study watersheds (Figs. 2–4). Estimated plant totals ranged from approximately 23,000 plants to approximately 32,000 plants per watershed (Table 3). Using the plant count estimates multiplied by our per plant daily water use estimate of 22.7 liters [27] we determined that water demands for marijuana cultivation range from 523,144 liters per day (LPD) to 724,016 LPD (Table 3). We also calculated the daily water use for each parcel that contained at least one marijuana cultivation site (S1 Table). Histograms showing the frequency distribution of daily water use per parcel are displayed for each watershed in Fig. 7. The majority of parcels in this study use an estimated 900 to 5,000 LPD for marijuana cultivation. These water use estimates are only based on irrigation needs for the marijuana plants counted or the greenhouses measured on that parcel, and do not account for indoor domestic water use, which in Northern California averages about 650 liters per day [32]. Thus, our water use demand estimates for marijuana cultivation are occurring in addition to domestic household uses that may occur and are also likely satisfied by surface water diversions.

Outdoor plants and greenhouses were identified from aerial images of Humboldt and Mendocino Counties. Greenhouse areas were estimated using the Google Earth measuring tool and

Table 3. Marijuana mapping summary of four watersheds.

Watershed	Outdoor Plants	Green-houses (counted)	Total area, m^2 (Green-houses)	Estimated Plants in Green-houses	Estimated Total Plants in Watershed	Estimated Water Use per Day (Liters)
Upper Redwood Creek	4,434	220	20749.4	18,612	23,046	523,144
Salmon Creek	11,697	302	20557.5	18,440	30,137	684,110
Redwood Creek South	10,475	324	18703.9	16,777	27,252	618,620
Outlet Creek	15,165	266	18651.1	16,730	31,895	724,016

doi:10.1371/journal.pone.0120016.t003

an average area of 1.11484 m^2 (converted from 12 ft^2) per plant was used to estimate total number of plants in greenhouses.

Minimum and maximum annual seven-day low flow values in these watersheds (Table 2) ranged from 0.0–0.05 cubic meters per second (CMS) in Outlet Creek to. 03 -. 26 CMS in

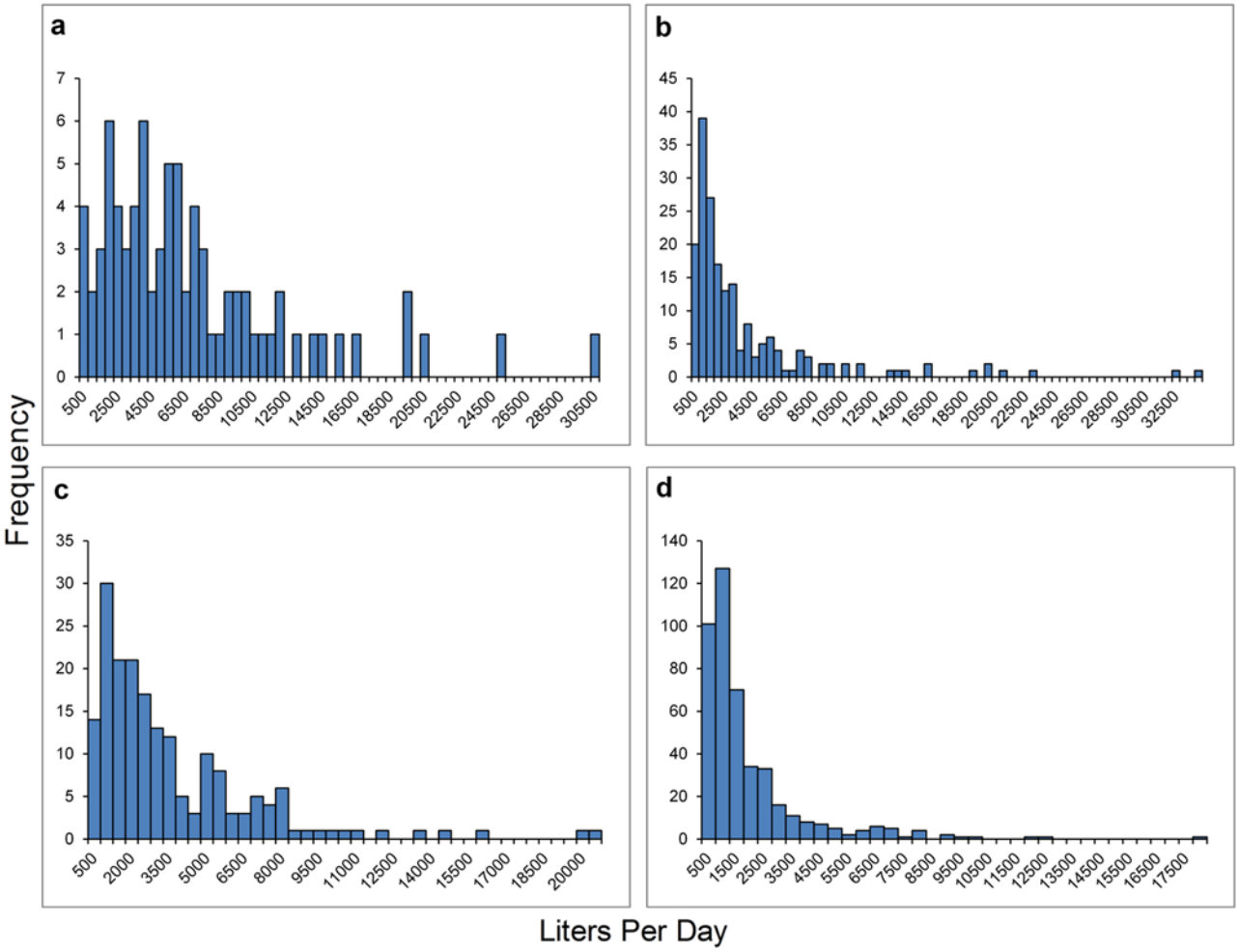

Fig 7. Frequency distribution of the water demand in liters per day (LPD) required per parcel for marijuana cultivation for each study watershed. (a) Upper Redwood Creek watershed, 79 parcels with marijuana cultivation, average water use 6622 LPD, (b) Salmon Creek watershed, 189 parcels with marijuana cultivation, average water use 3620 LPD, (c) Redwood Creek South watershed, 187 parcels with marijuana cultivation, average water use 3308 LPD, (d) Outlet Creek watershed, 441 parcels with marijuana cultivation, average 1642 LPD. See also S1 Table.

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Upper Redwood Creek. By comparing daily water demands to minimum and maximum annual seven-day low flow values, we arrived at a range of values that represent water demand for marijuana cultivation as a percentage of stream flow in each watershed (Table 4, S2 Table). In Upper Redwood Creek, which had the greatest summer flows (Table 2), we estimate water demand for marijuana cultivation is the equivalent of 2–23% of the annual seven-day low flow, depending on the water year. In Redwood Creek South, our data indicate that estimated water demand for marijuana cultivation is 34–165% of the annual seven-day low flow, and in Salmon Creek, estimated water demand for marijuana is 36–173% of the annual seven-day low flow. In Outlet Creek, estimated demand was 17% of the maximum annual seven-day low flow. However, the percent of the annual seven-day low flow minimum could not be calculated because this minimum stream flow was undetectable at the gage (flow <0.00 CMS) in nine of 38 years during the period of record (1957–1994). Due to this minimum annual seven-day low flow of almost zero, marijuana water demand is greater than 100% of the minimum annual seven-day low flow, but we cannot determine by how much.

We also compared the per-watershed daily water demands to the seven-day low flow values for each year of data available in order to better understand the magnitude and frequency of these water demands (Fig. 8, S2 Table). Although substantial demand for water for marijuana cultivation is a more recent and growing phenomenon, by comparing the water use estimates from our remote sensing exercise to historical stream flow data we can better understand how this demand as a percentage of stream flow may vary over the years. Our results indicate that if the same level of water demand for marijuana cultivation had been present for the period of record of the gages, this demand would have accounted for over 50% of streamflow during the annual seven-day low flow period in the majority of years in the Redwood Creek South and Salmon Creek watersheds (based on Elder Creek gage data that spans from water year 1968–2014). In Outlet Creek, the annual seven-day low flow data varied greatly over the period of record (water year 1957–1994) and was too low to measure in nine of the 38 years. The seven-day low flow value was therefore recorded as zero, which means that the water demand was greater than 100% of streamflow, but we could not calculate the water demand as a percentage of stream flow in those years. In Upper Redwood Creek, water demand was much less pronounced in comparison to stream flow, with water demand never accounting for more than 23% of the annual seven-day low flow, and accounting for 10% or greater of the annual seven-day low flow in only 30% of years during the period of record (water year 1954–2014 with a gap between 1959–1972). To summarize, we estimate that in three of the four watersheds evaluated, water demands for marijuana cultivation exceed streamflow during low-flow periods.

Table 4. Estimated water demand for marijuana cultivation expressed as a percentage of seven-day low flow in four study watersheds.

Watershed	Area (km^2)	Plants per km^2	Demand as percent of seven-day low flow	
			Percent of low flow maximum	Percent of low flow minimum
Upper Redwood Creek	175.3	131.6	2%	23%
Salmon Creek	95.1	316.9	36%	173%
Redwood Creek South	64.7	421.2	34%	165%
Outlet Creek	419.1	76.1	17%	>100%*

* The seven-day low flow minimum was measured as 0.0 CMS at the gage.

doi:10.1371/journal.pone.0120016.t004

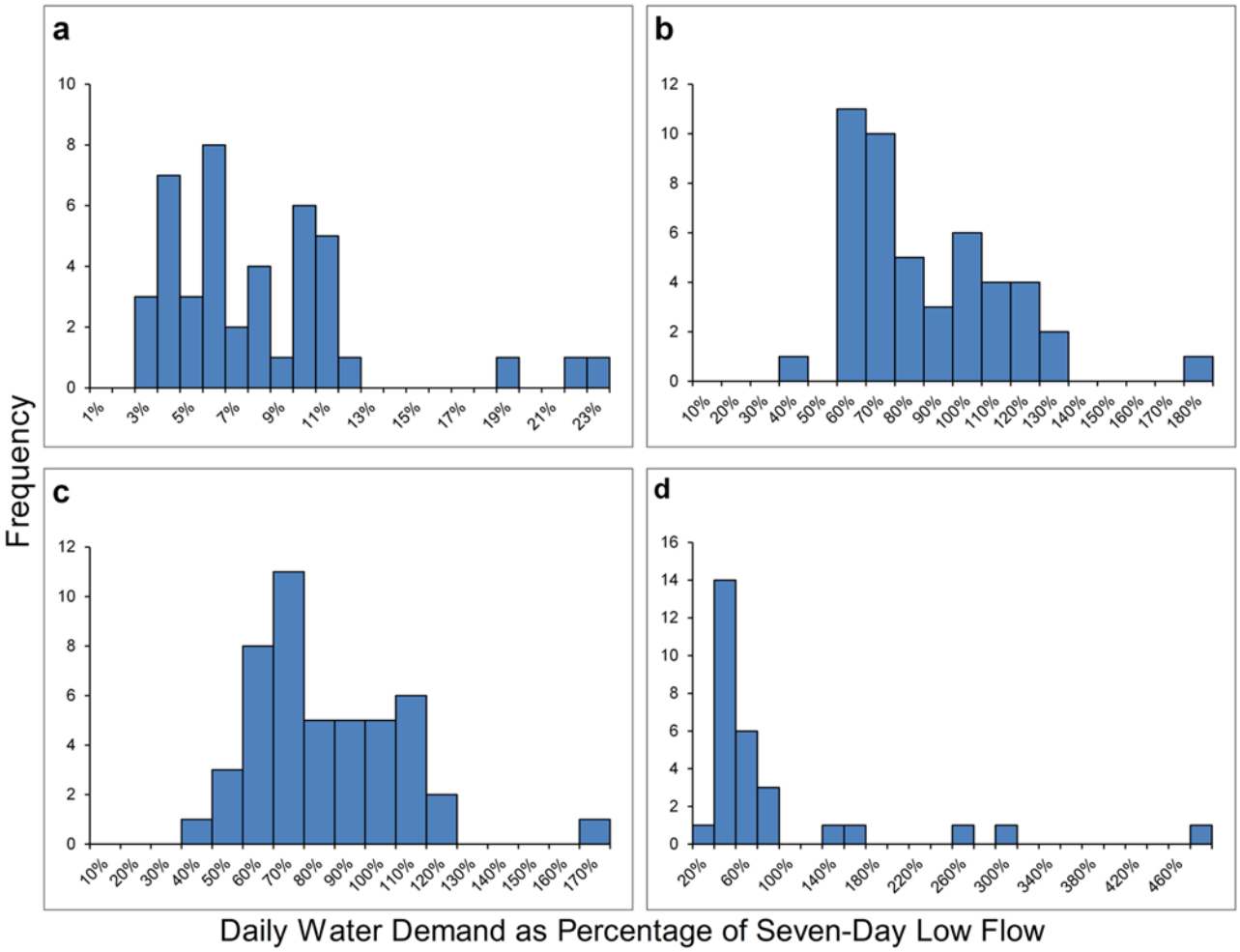

Fig 8. Frequency distribution of the water demand for marijuana cultivation as a percentage of seven-day low flow by year in each study watershed. Water demand data are from a remote sensing exercise using aerial imagery from 2011–2012 and are compared with each year's annual seven-day low flow value for the period of record in each study watershed: (a) Upper Redwood Creek watershed (USGS gage near Blue Lake, CA, coverage from water year (WY) 1954–1958 and 1973–2014), (b) Salmon Creek watershed (data modeled using USGS gage on Elder Creek, CA, coverage from WY 1968–2014), (c) Redwood Creek South (data modeled using USGS gage on Elder Creek, CA, coverage from WY 1968–2014), and (d) Outlet Creek (USGS gage near Longvale, CA, coverage from WY 1957–1994). Data from WYs 1977, 1981, 1987–1989, and 1991–1994 are excluded from Outlet Creek watershed due to seven-day low flow values of zero at the gage. Water demand as a percentage of seven-day low flow would be >100% in these years, but we cannot determine by how much.

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Discussion

Aerial Imagery Limitations and Water Demand Assumptions

Due to a number of factors, it is likely that the plant counts resulting from aerial imagery interpretation (Table 3) are minimum values. The detection of marijuana plants using aerial imagery was found most effective for larger cultivation plots in forest clearings greater than 10 m^2 because forest canopy cover and shadows can obscure individual plants or small plots, preventing detection. Some cultivators plant marijuana on a wide spacing in small forest canopy openings in order to avoid aerial detection [7,8]. The authors have also observed a variety of cultivation practices such as the use of large indoor cultivation facilities that could not be detected via aerial imagery. Moreover, a review of Google Earth historical aerial images after field inspections revealed that all MCSs visited in 2013 were either new or had expanded

substantially since the previous year. Therefore, it is likely our results underestimate the total number of plants currently grown in these study watersheds and consequently underestimate the associated water demands.

Marijuana has been described as a high water-use plant [2,15] that thrives in nutrient rich moist soil [33]. Marijuana's area of greatest naturalization in North America is in alluvial bottomlands of the Mississippi and Missouri River valleys where there is typically ample rain during the summer growing season [23,33]. Female inflorescences and intercalated bracts are the harvested portion of the marijuana plant. According to Cervantes [15], marijuana uses high levels of water for floral formation and withholding water stunts floral formation. Cervantes recommends marijuana plants be liberally watered and "allow for up to 10 percent runoff during each watering."

There is uncertainty as to actual average water use of marijuana plants because there are few reliable published reports on marijuana water use requirements. As with the cultivation of any crop, variation in average daily water use would be expected based upon many variables, including the elevation, slope, and aspect of the cultivation site; microclimate and weather; size, age, and variety of the plant; native soil type and the amount and type of soil amendments used and their drainage and water retention characteristics; whether plants are grown outdoors, in greenhouses, or directly in the ground or in containers and the size of the container; and finally, the irrigation system used and how efficiently the system is used and maintained [34–36]. However, our water demand estimate of 22.7 L/day/plant based on the limited industry data available [27] comports with the U.S. Department of Justice 2007 Domestic Cannabis Cultivation Assessment [2], which indicates marijuana plants require up to 18.9 L/day/plant.

In many rural watersheds in Northern California, the primary source for domestic and agricultural water is from small surface water diversions [37]. These diversions must be registered with the State Water Resources Control Board (SWRCB), the agency responsible for administering water rights in California. SWRCB registrations are also subject to conditions set by the California Department of Fish and Wildlife in order to protect fish, wildlife, and their habitats. However, when querying the SWRCB's public database, we found low numbers of registered, active water diversions on file relative to the number of MCSs we counted in the study watersheds. The total number of registered, active diversions on file with the SWRCB accounted less than half of the number of parcels with MCSs that were visible from aerial imagery (Fig. 9). In some watersheds, the number was as low as 6%. Since we do not know if the registered diversions on file with the SWRCB belong to parcels with MCSs, it is uncertain if the registered diversions in a particular watershed are connected with any of the MCSs we counted.

Our calculations of water demand as a percentage of stream flow assume that all potential water users are diverting surface water or hydrologically-connected subsurface flow. Historical water use practices and our field inspections with law enforcement support this assumption, although there are few hard data available as there are relatively few active registered water diversions on file with the Division of Water Rights when compared to the potential number of water users in the watersheds (Fig. 9).

Implicit in our calculations is the assumption that all water users are pumping water at the same rate throughout the day, as well as throughout the growing season. In reality, we expect water demand to gradually increase throughout the season as plants mature. This increased water demand would coincide with the natural hydrograph recession through the summer months, creating an even more pronounced impact during the summer low-flow period. In a similar study that monitored flow in relation to surface water abstraction for vineyard heat protection, flows receded abnormally during periods of high maximum daily temperature [21]. These results indicate that water users can have measureable effects on instantaneous flow in periods of high water demand. Our results suggest that similar impacts could occur during the summer low flow period in the study watersheds.

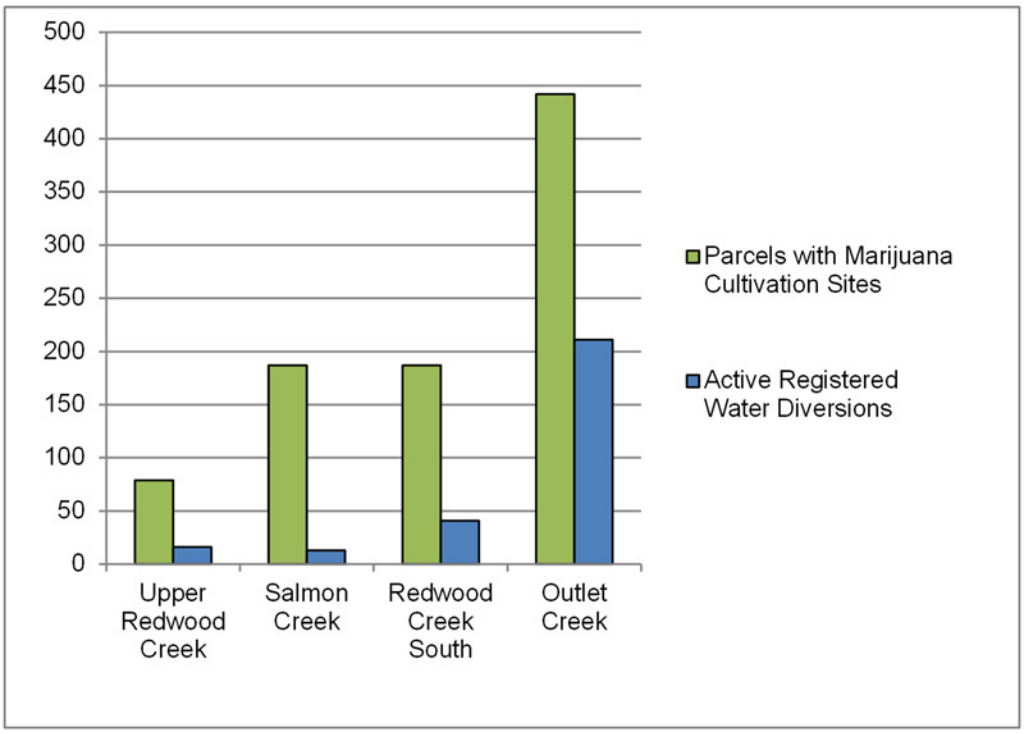

Fig 9. Active water rights in the study watersheds. Parcels with active registered water diversions (on file with California's Division of Water Rights) compared to parcels with marijuana cultivation sites (MCSs) in the four study watersheds.

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Additionally, our analysis assumes the water withdrawals will impact the entire watershed in an even, consistent way. In reality, we would expect water demand to be more concentrated at certain times of day and certain periods of the growing season, as described above. Furthermore, results of our spatial analysis indicate that MCSs are not evenly distributed on the landscape, thus impacts from water withdrawals are likely concentrated in certain areas within these watersheds. Because of these spatially and temporally clustered impacts, we may expect to see intensification of stream dewatering or temperature elevation in certain tributaries at certain times of year, which could have substantial impacts on sensitive aquatic species. Recent data indicate that peaks in high stream temperatures and annual low-flow events are increasing in synchrony in western North America [38], an effect that would be exacerbated by the surface water withdrawals we describe here. Further modeling and on-the-ground stream flow and temperature observations are needed to elucidate the potential extent of these impacts. The minimum streamflow estimates in Salmon Creek, Redwood Creek South, and Outlet Creek are so low that even a few standard-sized pumps operating at 38 liters per minute (LPM), which is a standard rate approved by the SWRCB for small diversions, could dewater the mainstem stream if more than four pumps ran simultaneously in any one area. It follows that impacts on smaller tributaries would be even more pronounced. In addition, on-site observations of MCS irrigation systems, though anecdotal, indicate many of these water conveyance, storage, and irrigation systems lose a substantial amount of water through leaks and inefficient design. This would significantly increase the amount of surface water diverted from streams beyond what would actually be needed to yield a crop. More study is needed to fully understand the impacts of MCS water demand on instantaneous flow in these watersheds.

Given that marijuana cultivation water demand could outstrip supply during the low flow period, and based on our MCS inspections and surface water diversion and irrigation system observations, we surmise that if a MCS has a perennial water supply, that supply would be used exclusively. However, for MCSs with on-site surface water sources that naturally run dry in summer, or are depleted though diversion, it is likely that direct surface water diversion is used until the source is exhausted, then water stored earlier in the year or imported by truck supplants the depleted surface water. It is difficult to determine to what degree imported water and wet season water storage is occurring. However, our on-site MCS inspections support the assumption that the vast majority of irrigation water used for marijuana cultivation in the study watersheds is obtained from on-site surface water sources and water storage and importation is ancillary to direct surface water diversions.

Comparison of Water Demands to Summer Low Flows

Our results suggest that water demand for marijuana cultivation in three of the study watersheds could exceed what is naturally supplied by surface water alone. However, in Upper Redwood Creek, the data suggest that marijuana cultivation could have a smaller impact on streamflow, with demand taking up approximately 2% to 23% of flow (Table 4). This projected demand of flow contrasts with the 34% to >100% flow demand range in the other watersheds, most likely because Upper Redwood Creek has greater mean annual precipitation, less evapotranspiration, and generally higher stream flow than the other watersheds (Tables 1–2). Furthermore, approximately half of the Upper Redwood Creek watershed is comprised of either large timber company holdings or federal lands. As Fig. 2 illustrates, MCSs in Upper Redwood Creek are concentrated within a relatively small area of privately-owned land that has been subdivided. It stands to reason that if all the land within the Upper Redwood Creek watershed was subject to the subdivision and parcelization that has occurred in Redwood Creek South, Salmon Creek, or Outlet Creek, the potential impacts to stream flow would also be greater.

In Outlet Creek, our results indicate a large range of potential water demand as a percentage of streamflow, from 17% in a "wet" year to greater than 100% when the stream becomes intermittent, as it does during many summers. Our data indicate that impacts to streamflow will vary greatly depending on the individual watershed characteristics, whether the year is wetter or drier than average, and the land use practices taking place.

Environmental Impacts

The extent of potential environmental impacts in these watersheds is especially troubling given the region is a recognized biodiversity hotspot. According to Ricketts et al. [39], the study watersheds occur within the Northern California Coastal Forests Terrestrial Ecoregion. This ecoregion has a biological distinctiveness ranking of "globally outstanding" and a conservation status of "critical" [39]. For example, Redwood National Park, 20 km downstream of the Upper Redwood Creek sub-basin, has approximately 100 km^2 of old-growth redwood forest, which is one of the world's largest remaining old-growth redwood stands. The study watersheds also occur within the Pacific Mid-Coastal Freshwater Ecoregion defined by Abell et al. [40]. This ecoregion has a "Continentally Outstanding" biological distinctiveness ranking, a current conservation status ranking of "Endangered" and its ranking is "Critical" with regards to expected future threats [40]. Not surprisingly, numerous sensitive species, including state- and federally-listed taxa, occur in the study watersheds or directly downstream (Table 5).

Our results indicate that the high water demand from marijuana cultivation in these watersheds could significantly impact aquatic- and riparian-dependent species. In the Pacific Coast Ecoregion, 60% of amphibian species, 16% of reptiles, 34% of birds, and 12% of mammals can

Table 5. Sensitive aquatic species with ranges that overlap the four study watersheds: Upper Redwood Creek (URC), Redwood Creek South (RCS), Salmon Creek (SC), and Outlet Creek (OC).

Scientific Name	Common Name	Conservation Status in California	Study Watershed
Oncorhynchus kisutch	coho salmon	State and federally-threatened	URC, RCS, SC, OC
Oncorhynchus tshawytscha	Chinook salmon	federally-threatened	URC, RCS, SC, OC
Oncorhynchus clarki clarki	coastal cutthroat trout	SSC[1]	URC
Oncorhynchus mykiss	steelhead trout	federally-threatened	URC, RCS, SC, OC
Rana aurora	northern red-legged frog	SSC	URC, RCS, SC, OC
Rana boylii	foothill yellow-legged frog	SSC	URC, RCS, SC, OC
Rhyacotriton variegatus	southern torrent salamander	SSC	URC, RCS, SC, OC
Ascaphus truei	coastal tailed frog	SSC	URC, RCS, SC
Emys marmorata	western pond turtle	SSC	RCS, SC, OC
Margaritifera falcata	western pearlshell	S1S2[2]	URC

[1]The California Department of Fish and Wildlife designates certain vertebrate species as Species of Special Concern (SSC) because declining population levels, limited ranges, and/or continuing threats have made them vulnerable to extinction. Though not listed pursuant to the Federal Endangered Species Act or the California Endangered Species Act, the goal of designating taxa as SSC is to halt or reverse these species' decline by calling attention to their plight and addressing the issues of conservation concern early enough to secure their long-term viability.

[2] The California Natural Diversity Database (CNDDB) designates conservation status rank based on a one to five scale, one being "Critically Imperiled", five being "Secure". Uncertainty about a rank is expressed by a range of values, thus a status of S1S2 indicates that there is uncertainty about whether *Margaritifera falcata* ranks as state "Critically Imperiled" (S1) or state "Imperiled" (S2) [41].

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be classified as riparian obligates, demonstrating the wide range of taxa that potentially would be affected by diminished stream flows [42]. The impacts of streamflow diversions and diminished or eliminated summer streamflow would however disproportionately affect aquatic species, especially those which are already sensitive and declining.

Impacts to Fish

Northern California is home to some of the southernmost native populations of Pacific Coast salmon and trout (i.e., salmonids) and the study area is a stronghold and refugia for their diversity and survival. Every salmonid species in the study watersheds has some conservation status ranking (Table 5). California coho salmon, for example, have undergone at least a 70% decline in abundance since the 1960s, and are currently at 6 to 15% of their abundance during the 1940s [43]. Coho salmon populations in all four study watersheds are listed as threatened under both the California and the Federal Endangered Species Acts, and are designated as key populations to maintain or improve as part of the Recovery Strategy of California Coho Salmon [43].

Of California's 129 native inland fish species, seven (5%) are extinct in the state or globally; 33 (26%) are in immediate danger of becoming extinct (endangered), and 34 (26%) are in decline but not at immediate risk of extinction (vulnerable) [44]. According to Katz et al. [45], if present population trends continue, 25 (78%) of California's 32 native salmonid taxa will likely be extinct or extirpated within the next century.

The diminished flows presented by this study may be particularly damaging to salmonid fishes because they require clean, cold water and suitable flow regimes [44]. In fact, water diversions and altered or diminished in-stream flows due to land use practices have been identified as having a significant impact on coho salmon resulting in juvenile and adult mortality [43].

Additionally, all four study watersheds are already designated as impaired for elevated water temperature and sediment by the U.S. Environmental Protection Agency pursuant to the Clean

Water Act Section 303(d). Reduced flow volume has a strong positive correlation with increased water temperature [44]. Increased water temperatures reduce growth rates in salmonids, increase predation risk [46], and increase susceptibility to disease. Warmer water also holds less dissolved oxygen, which can reduce survival in juvenile salmonids [44]. Both water temperature and dissolved oxygen are critically important for salmonid survival and habitat quality [47–50].

Reduced stream flows can also threaten salmonids by diminishing other water quality parameters, decreasing habitat availability, stranding fish, delaying migration, increasing intra and interspecific competition, decreasing food supply, and increasing the likelihood of predation [43]. These impacts can have lethal and sub-lethal effects. Experimental evidence in the study region suggests summer dry-season changes in streamflow can lead to substantial changes in individual growth rates of salmonids [51]. Complete dewatering of stream reaches would result in stranding and outright mortality of salmonids, which has been observed by the authors at a number of MCSs just downstream of their water diversions.

Impacts to Amphibians

Water diversions and altered stream flows are also a significant threat to amphibians in the northwestern United States [52,53]. The southern torrent salamander (*Rhyacotriton variegatus*) and coastal tailed frog (*Ascaphus truei*) are particularly vulnerable to headwater stream diversions or dewatering, which could lead to mortality of these desiccation-intolerant species [54]. To maximize the compatibility of land use with amphibian conservation, Pilliod and Wind [53], recommend restoration of natural stream flows and use of alternative water sources in lieu of developing headwater springs and seeps.

Numerous studies have documented the extreme sensitivity of headwater stream-dwelling amphibians to changes in water temperature [55,56] as well as amounts of fine sediment and large woody debris [57,58]. Additionally, Kupferberg et al. and others [52,59] have demonstrated the impacts of altered flow regimes on river-dwelling amphibians. However, the threat of water diversion and hydromodification—or outright loss of flow—from headwaters streams has not been well-documented in the amphibian conservation literature. This is likely because illegal and unregulated headwater stream diversions did not exist at this scale until the recent expansion of marijuana cultivation in the region. In contrast, timber harvesting, which until recently was the primary land use in forested ecoregions in the western United States, does not typically divert headwater streams in the same manner as MCSs. Timber harvesting operations, at least in California, have state regulatory oversight that requires bypass flows to maintain habitat values for surface water diversions. Thus, the results of our study highlight an emerging threat to headwater amphibians not addressed in Lannoo [60], Wake and Vredenburg [61], or more recently in Clipp and Anderson [62]

Future Water Demands and Climate Change

Flow modification is one of the greatest threats to aquatic biodiversity [63]. As in many parts of the world, the freshwater needed to sustain aquatic biodiversity and ecosystem health in our study area is also subject to severe competition for multiple human needs. The threats to human water security and river biodiversity are inextricably linked by increasing human demands for freshwater [64,65]. In California, irrigated agriculture is the single largest consumer of water, taking 70–80% of stored surface water and pumping great volumes of groundwater [44]. In our study area, agricultural demands account for 50–80% of all water withdrawals [66]. Only late in the last century have the impacts of water diversions on aquatic species become well recognized. However, these impacts are most often assessed on large regional scales, e.g.

major rivers and alluvial valleys, and the large hydroelectric dams, reservoirs, and flood control and conveyance systems that regulate them [67].

Few studies thus far have assessed the impacts of many small agricultural diversions on zero to third order streams and their cumulative effects on a watershed scale [21,22]. On a localized scale, with regional implications, this study detects an emerging threat to not only aquatic biodiversity but also human water security, since surface water supplies most of the water for domestic uses in watersheds throughout Northwestern California [37]. In these watersheds, the concept of "peak renewable water," where flow constraints limit total water availability [68], may have already arrived. In other words, the streams in the study watersheds simply cannot supply enough water to meet current demands for marijuana cultivation, other human needs, and the needs of fish and wildlife.

Due to climate change, water scarcity and habitat degradation in northern California is likely to worsen in the future. Regional climate change projections anticipate warmer average air temperatures, increases in prolonged heat waves, decreases in snow pack, earlier snow melt, a greater percentage of precipitation falling as rain rather than snow, a shift in spring and summer runoff to the winter months, and greater hydroclimatic variability and extremes [69–77]. Consequently, future hydrologic scenarios for California anticipate less water for ecosystem services, less reservoir capture, a diminished water supply for human uses, and greater conflict over the allocation of that diminished supply [70,71,75,78,79]. Climate change is expected to result in higher air and surface water temperatures in California's streams and rivers in the coming decades, which in turn could significantly decrease suitable habitat for freshwater fishes [80–83]. Due to a warming climate, by 2090, 25 to 41% of currently suitable California streams may be too warm to support trout [84].

Already, gage data and climate stations in northwestern California show summer low flow has decreased and summer stream temperatures have increased in many of northern California's coastal rivers, although these changes cannot yet be ascribed to climate change [85]. In an analysis of gage data from 21 river gaging stations, 10 of the gages showed an overall decrease in seven-day low flow over the period of record. This dataset included Upper Redwood Creek as well as the South Fork Eel River, the receiving water body for Redwood Creek South and Salmon Creek [85].

Our analysis suggests that for some smaller headwater tributaries, marijuana cultivation may be completely dewatering streams, and for the larger fish-bearing streams downslope, the flow diversions are substantial and likely contribute to accelerated summer intermittence and higher stream temperatures. Clearly, water demands for the existing level of marijuana cultivation in many northern California watersheds are unsustainable and are likely contributing to the decline of sensitive aquatic species in the region. Given the specter of climate change induced more severe and prolonged droughts and diminished summer stream flows in the region, continued diversions at a rate necessary to support the current scale of marijuana cultivation in northern California could be catastrophic for aquatic species.

Both monitoring and conservation measures are necessary to address environmental impacts from marijuana cultivation. State and federal agencies will need to develop more comprehensive guidelines for essential bypass flows in order to protect rearing habitat for listed salmonid species and other sensitive aquatic organisms. Installation of additional streamflow gages and other water quality and quantity monitoring will be necessary to fill data gaps in remote watersheds. In addition, increased oversight of water use for existing MCSs and increased enforcement by state and local agencies will be necessary to prevent and remediate illegal grading and forest conversions. Local and state governments will need to provide oversight to ensure that development related to MCSs is permitted and complies with environmental regulations and best management practices. Local and state agencies and nonprofit

organizations should also continue to educate marijuana cultivators and the public about the environmental threats, appropriate mitigation measures, and permit requirements to legally develop MCSs and best protect fish and wildlife habitat. Finally, local governments should evaluate their land use planning policies and ordinances to prevent or minimize future forestland conversion to MCSs or other land uses that fragment forestlands and result in stream diversions.

Supporting Information

S1 Table. Number of outdoor plants counted, area of greenhouses measured, and estimated water use in Liters per day for each parcel in the study watersheds.
(XLSX)

S2 Table. Per-watershed daily water demands compared to seven-day low flow by year.
(XLSX)

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Author Contributions

Conceived and designed the experiments: SB MVH LM AC JO. Analyzed the data: JO AC MT SB MVH GL. Wrote the paper: GL JO AC MT SB. Collected the data: AC JO SB MVH GL.

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From: Bill Krawetz <billkrawetz@comcast.net>
Sent: Friday, September 1, 2023 10:55 PM
To: Public Comment@Cannabis
Subject: RE: Comments on NOP for EIR of Commercial Cannabis Cultivation in Mendocino County.
Attachments: Pot Mendo watershed.jpg

Follow Up Flag: Follow up
Flag Status: Flagged

Dear DCC

One more comment provided on NOP for Mendocino EIR for Commercial Cannabis Cultivation:

A CDFW Study identified "POTs growing strain on streams" due to the high concentration of growers in many areas. See attached graph. The graph shows many areas where growers have overlapping water consumption from the same water source. These impacts should be studied in the EIR and appropriate limits placed to safeguard water availability for wildlife and normal residential uses. The "new normal" of drought conditions is the proper baseline.

Thanks again
Bill Krawetz

From: Bill Krawetz [mailto:billkrawetz@comcast.net]
Sent: Friday, September 1, 2023 11:28 AM
To: 'publiccomment@cannabis.ca.gov'
Subject: Comments on NOP for EIR of Commercial Cannabis Cultivation in Mendocino County.

Dear DCC,

The following are comments on what should be included in the EIR study. These items much be evaluated and properly dealt with for the EIR to be valid.

1. Illegal growers- The operations of these growers must be studied and accounted for. It is estimated there are significantly more illegal growers than legal growers. The local law enforcement team reported they only have the resources to deal with ~100 sites per year, yet there are tens of thousands growers. See attached article and highlights below:
   https://www.courier-journal.com/in-depth/news/crime/2021/12/17/mexican-drug-cartels-move-in-on-californias-shadow-marijuana-industry/6036056001/

   Highlights:

Mendocino County Sheriff Matt Kendall told The Courier Journal there are as many as 10,000 illegal grows in his jurisdiction, a two-hour drive north of San Francisco. He tries to target the worst 100, which is all his small force can handle in a year.

"We have international cartels successfully operating here" setting up multi-million dollar farm operations, said California Assemblyman Tom Lackey, R-Palmdale, a former highway patrolman.

"They're poisoning our ground and stealing our water, and we have drought out here," he said.

A glimpse at what he's dealing with: Christopher Wayne Gamble, who allegedly operated large illegal crops near the town of Willits, in central Mendocino County, is charged with murdering a 17-year-old boy and his father who came from Mexico seeking work, according to Mendocino County Superior Court records. detectives found the victims' headless bodies in April in a ditch under a pile of tires that had been set on fire.

Illegal growers are using dangerous chemicals from Mexico that poison animals and contaminate soil.
Armed criminal networks set up illegal grows on federal land in national forests.
Illegal cannabis used to make a nearly pure form of THC is linked to explosions that have burned children and killed adults.

Farmers once fetched up to $4,000 per pound, but a saturated market across the state has driven down prices to $400 or less. Illegal sellers can ship it to get triple the price on the East Coast, Sena said.

A decade ago, 20 acres with a house and barn would have sold for $200,000 or less. Now, it can fetch more than $1 million. "Almost everybody that grows dope up here is from San Jose,"

After doing flyovers, sheriff's investigators estimate there are a million pot plants on the valley floor(Covelo), an area about seven by eight miles. That's less than 2% of the county's landmass. Mexican drug cartels move in on California's shadow marijuana industry. The sheriff estimates that 95% are illegal

"Some of the marijuana being moved across the country is born on the back of slave labor," said Sena, who also heads up the Northern California Regional Intelligence Center. "Often the people brought in to do labor are mistreated" on illegal marijuana farms. Other farm workers, including young men used for sex and labor trafficking, weren't rescued in time. Some were forced to live in squalor without plumbing. Others ended up dead and many are missing, the sheriff said.

An average of more than 2 million cannabis plants were eradicated on federal land from 2007-2019 — more than a million of which was grown in California, Gabriel said.

2. Water impacts: Study the impacts of cannabis water usage on steam depletion and the impacts to wildlife and residents.
    a. CDFW study: "Impacts of Surface Water Diversions for Marijuana Cultivation on Aquatic Habitat in Four Northwestern California Watersheds" Included Mendocino County: See attached report. Highlights:
        i. Our results indicate that water demand for marijuana cultivation has the potential to divert substantial portions of streamflow in the study watersheds, with an estimated flow reduction of up to 23% of the annual seven day low flow in the least impacted of the study watersheds. Estimates from the other study watersheds indicate that water demand for marijuana cultivation exceeds streamflow during the low-flow period.
    b. Nature Conservancy/others study on Navarro River area. See attached report. Highlights:
        i. points out the linkage between reduction in streamflow with groundwater pumping. In the Navarro study wells 3/4 mile away from a stream have a big impact. The study seems to use actual sites but estimates of usage.

ii. Cannabis wells cause a disproportionate amount of stream depletion. Cannabis well are less than 25% of total wells (18% of total) but caused over 50% of depletion. The study looks at both Cannabis and Residential uses
iii. Residential uses cause ~5X depletion of cannabis. But there are approximately 4.3x more Residential well (1314 total) than cannabis wells (302 total)
    1. Comment: Comparing Residential use to cannabis use might be misleading. Residential use includes drinking, cooking, bathing, toilets, gardens, etc. Cannabis is one discretionary use.
iv. Streamflow depletion increases nonlinearly when pumping within ¾ mile of stream. Most wells (over 50%) within this range
v. Streamflow depletion worse in late summer when groundwater is a critical source of base flow to ecologically important streams. Residential and Cannabis use peak in Summer
vi. Stream depletion mainly caused by well distance from stream and well usage. Subsurface properties such as transmissivity are next important

3. Fire Safe Road regulations: Commercial Cannabis Cultivation operations must adhere to and only be allowed to operate in locations that met the Fire Safe Regulations:
    a. Summary of Updated State Minimum Fire Safe Regulations, Comments from Board of Forestry's Final Statement of Reasons August 17, 2022
    b. Synopsis:
        i. The State Board of Forestry and Fire Protection (BOF) unanimously approved the updated State Minimum Fire Safe Regulations (FSR) at its August 17, 2022, meeting. These regulations retain the identical road regulations as in the current 2020 FSR. This includes 20 ft wide roads, dead-end roads no longer than 800 ft to 1 mile, as well as many other specifications. The BOF, as well as the California Attorney General's Office, decisively confirmed that the FSR apply to all existing roads, and cover access to as well as within a parcel. The Exception process must follow strict requirements with material facts to demonstrate Same Practical Effect within a development perimeter. For subpar public roads needing improvement to meet the FSR, it's up to the county to determine either if the county will pay or if it requires the applicant to pay, or if no upgrades are made, to prevent the development from proceeding.
    c. Relevant Excerpts from the State Fire Safe Regulations and the Final Statement of Reasons.
        i. The State Board of Forestry and Fire Protection (BOF) unanimously approved minor revisions to the State Minimum Fire Safe Regulations (FSR) at its August 17, 2022, meeting and the Final Statement of Reasons (FSOR), for formal processing by Office of Administrative Law. These regulations govern all new development in the State Responsibility Area (SRA) as well as Very High Fire Hazard Severity Zone (VHFHSZ) in the Local Responsibility Area (LRA). The revised regulations retain the identical road regulations as are in the current 2020 FSR, including:
        ii. • Minimum 20 ft wide roads for all 2-way roads (two 10-ft wide traffic lanes excluding striping and shoulders)
        iii. • Dead end roads no longer than 800 ft, 1320 ft, 2640 ft or 1 mile, depending on smallest parcel served (i.e., ranging from 800 ft dead-end length limit if any parcel served is less than 1 acre, to 1 mile dead-end length limit if all parcels served are 20 acres or more)
        iv. • Grades of no more than 16%, up to 20% with mitigations
        v. • Specifications for curve radius, bridge weight ratings, gates, road surface, turnouts, turnarounds
        vi. • Length of 1-way roads no longer than 1/2 mile, plus other requirements including to connect with 2-way roads (i.e., minimum 20 ft wide) at each end
        vii. • Only 20 ft wide roads, not 10 ft wide driveways, can access any commercial facility
        viii. • Must provide for safe concurrent fire apparatus ingress and civilian evacuation, and unobstructed traffic circulation during a wildfire
    d. Exceptions can be applied for by applicants within a parcel or development perimeter (e.g., on private roads), but only if applicants provide material facts demonstrating the Same Practical Effect within that

perimeter as provided by the standards enumerated (see above) in the FSR (FSR § 1270.07; FSOR p. 593).

e. Local regulations must at minimum meet the criteria of the FSR. Local jurisdictions cannot apply exemptions not set forth in the FSR (such as exempting existing or pre-1991 roads as sought by Sonoma County in its 2020 ordinance, which the BOF accordingly refused to certify) (§FSR § 1270.05; FSOR p. 594).

f. Public roads must also meet the minimum FSR for any new development to occur. There is no mechanism specified in the FSR for Exceptions on public roads outside a development or parcel perimeter. BOF has previously explained that if improvements are needed to such public roads, it's up to the county to determine whether such improvements are paid for by the developer or the county (October 23, 2020, letter from BOF to Sonoma County Counsel). If not in compliance, then the new development cannot occur if accessed by subpar public roads.

g. The FSR apply equally to public and private roads (FSR § 1270.01(y); FSOR pp. 5-7). BOF has also reiterated a 2019 California Attorney General's letter confirming that the FSR apply to existing public access roads leading to a proposed development that are beyond the development perimeter (FSOR pp. 6-7). BOF reiterated these statements in response to and thus contradicting assertions in a May 27, 2022, letter to BOF from Rural County Representatives of California (RCRC). RCRC erroneously claimed that the FSR only applied to the limited area within a parcel or development perimeter and not to existing roads outside the perimeter, misapplying the BOF definition of "Defensible Space". However, RCRC failed to note that the BOF definition of Defensible Space is limited to applicability of Exceptions, not to scope. Importantly, neither that definition nor Exceptions are included in nor limit the scope of the underlying code PRC 4290. Rather, BOF wrote both definitions to delineate a mechanism for requesting Exceptions within a parcel or development perimeter. RCRC wrongly tried to apply this specific narrow definition of Defensible Space – to reiterate, which definition is limited only to Exceptions in the FSR - to instead limit the scope, despite that scope was never so limited by BOF in the FSR as that would violate PRC 4290. Furthermore, as the vast majority of roads providing access to new development are outside a parcel/development perimeter, the entire Article 2 of the FSR, which encompasses extensive road specifications (i.e., road widths, curve radius, turnarounds, grade limits, bridge weight limits, dead-end road limits across multiple parcels, etc.), would be essentially meaningless if the FSR were limited to within a parcel or development perimeter (where the infrastructure is mainly driveways and occasionally a private road). Sonoma County should not rely on RCRC's flawed and indefensible argument in its May 27 letter, which was refuted by BOF in the FSOR (p.557).

h. It is important to understand that roads only need to meet the FSR for new development (residential, commercial, or industrial); roads do not need improvement for existing development. As the FSR have been state law since 1991, any new development after 1991 should have only been on roads meeting the FSR. Unfortunately, this was not always the case in Sonoma County.

i. The County must adhere to state law in the FSR for all new development. If an Exception is requested, it must follow the requirements of the FSR including with material facts supporting that it provides the Same Practical Effect as the standards enumerated in the FSR (§ 1270.07; FSOR, p. 593). As noted above, such Exceptions are limited to roads and driveways within a parcel or development perimeter. The County has violated the FSR and Exceptions provision on many approvals including several in 2021, approving new development accessed solely by subpar public roads, and stating that Exceptions were documented providing Same Practical Effect when in fact the public record confirmed that no such Exception documents exist. We hope going forward that the County will adhere to the FSR.

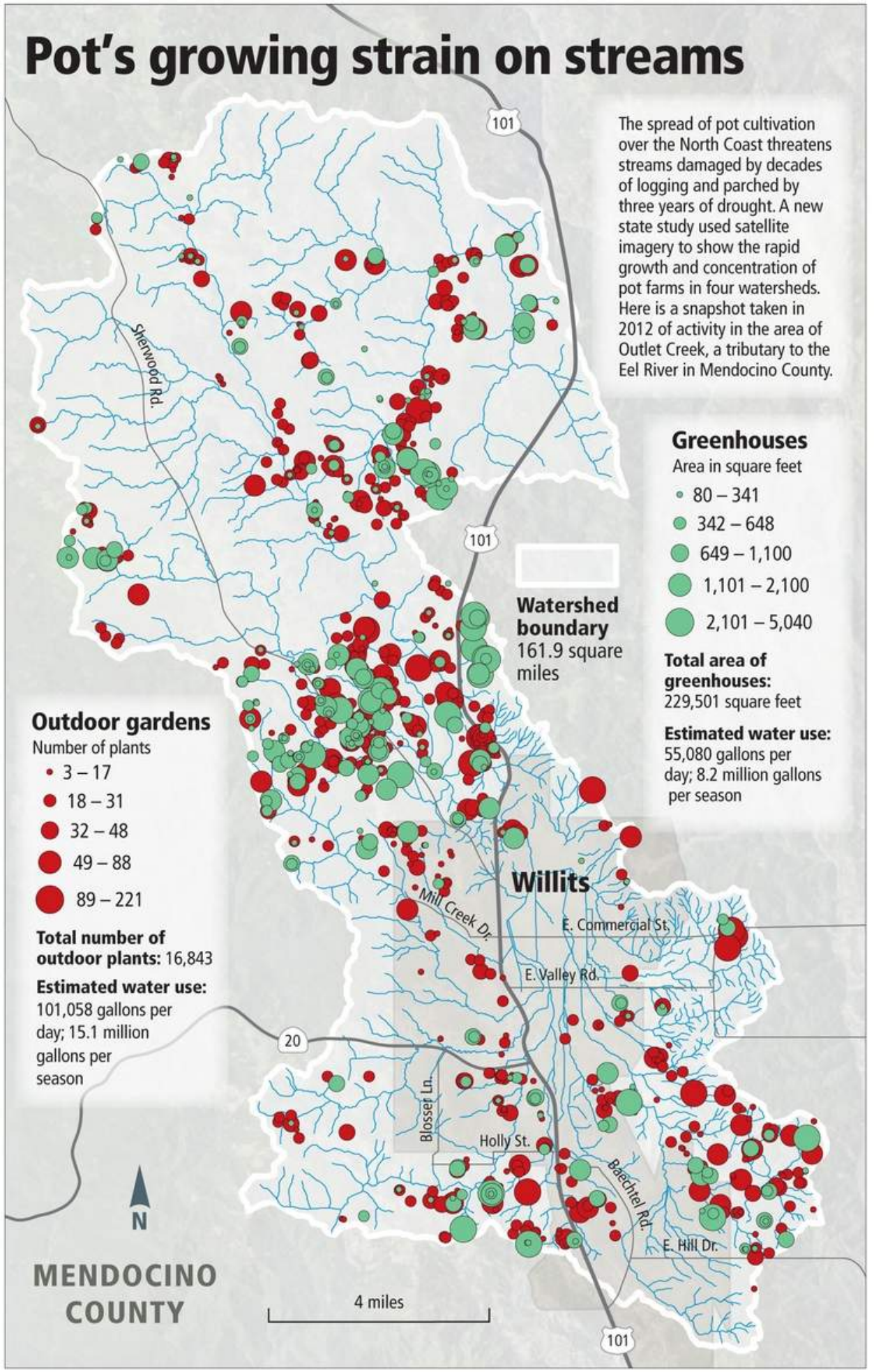
j. To assist counties, the BOF has agreed to work with CalFire leadership on training for CalFire employees and local jurisdictions on correct implementation of the FSR. Such training will benefit the County in streamlining its development approval processes, including correctly applying the FSR to existing roads both within and outside a parcel or development perimeter, and on preventing abuse of Exceptions which would undermine the intent of the FSR.

4. <u>The DCC NOP document provides little definition</u>:

a. NOP states “The NOP provides sufficient information describing the Project and its potential environmental effects to allow recipients the opportunity to provide a meaningful response related to the scope and content of the EIR” and provides the following Project Description: PROJECT DESCRIPTION
    i. The DCC has issued approximately 608 provisional commercial cannabis cultivation licenses in Mendocino County. The Project consists of the DCC actions to approve annual licensing of such commercial cannabis cultivation operations in Mendocino County under California Code of Regulations, title 4, section 15002.The EIR will programmatically evaluate the environmental impacts of the DCC’s annual licensing of commercial cannabis cultivation operations in the county as well as the environmental impacts of future licensed commercial cannabis cultivation operations.
b. Considering the NOP is only 3 pages long and written at a very high level, it is difficult to impossible for the public to fully understand the full scope to properly comment.

Thanks
Bill Krawetz

Pot's growing strain on streams



Source: California Fish and Wildlife Department

LOREN DOPPENBERG / For The Press Democrat

August 31, 2023

Department of Cannabis Control
c/o Angela McIntire-Abbott
2920 Kilgore Road,
Rancho Cordova, CA 95670
publiccomment@cannabis.ca.gov.

SUBJECT: Comments Regarding the Department of Cannabis Control (DCC) Proposed Draft Environmental Impact Report for the Licensing of Commercial Cannabis Cultivation in Mendocino County, California.

This letter presents comments regarding a proposed Draft Environmental Impact Report (DEIR) for the Licensing of Commercial Cannabis Cultivation in Mendocino County, California. The California Geological Survey (CGS) is a division within the Department of Conservation which in turn is part of the Natural Resources Agency, a responsible agency within California State Code responsible for Land Use. The Department of Conservation (DOC) regulates specific aspects of oil, gas, and geothermal energy production; surface mining operations and associated land reclamation; and establishes regulatory zones related to certain seismic hazards that can impact local land use (https://www.conservation.ca.gov/cgs/minerals, https://www.conservation.ca.gov/cgs/sh).

A program within CGS, named the Forest and Watershed Geology Program (FWG, https://www.conservation.ca.gov/cgs/fwg) is part of a multi-agency review group that performs engineering geologic review of timber harvest projects in California. Our work involves evaluating proposed land use (timber harvesting and land conversions) relative to potential adverse impacts to public safety and the environment. Some of our engineering geologic evaluations have included requests from our multi-agency partners (CAL FIRE, Regional Water Quality Control Boards, Department of Fish and Wildlife) regarding public safety and grading operations within cannabis cultivation operations in Mendocino County (referenced below).

CEQA versus Geologic Hazards

While the California Environmental Quality Act (CEQA) contains a section about Geology and Soils, DEIRs sometimes don't address the slope stability and engineering aspects of a project, instead providing general descriptions about the geologic and soil conditions underlying a project area.

Slope stability can be thought of as the factors that tend to keep a hillslope in place (for example friction, competent rock strength, and low slope gradients) versus factors that tend to cause a hillslope to fail (for example the force of gravity, water, and steep slope gradients). Only California licensed Professional Geologists (PG), California Certified

Engineering Geologists (CEG) and Civil Engineers (PE) are qualified to evaluate proposed grading projects with regard to slope stability in California (see CA 2023 Geology and Geophysical Act, accessed at https://www.bpelsg.ca.gov/laws/gg_regs.pdf., and CEQA Article 9, Sec.15149. Use of Registered professionals in Preparing EIRs

Grading projects typically include movement of earth materials that can affect slope stability. **Excavating** (digging) into a slope can adversely impacts slope stability by undermining or removing support from material above the area of excavation. **Placing** fill materials on or above steep slopes can adversely impact slope stability by increasing the mass on steep slopes. The introduction of water (**ponding**) into the ground can adversely impact slope stability by saturating and weakening the internal strength of the underlying earth materials.

The potential failure of developed slopes onto infrastructure (for example homes, roads, transmission lines) poses a risk to the safety and welfare of people located downslope of a grading project. Slope failure will likely incur costs required mitigate potential slope failures. Reference herein are several evaluation reports by CGS regarding unpermitted grading projects in Mendocino County resulting from cannabis operations that threatened downslope properties. We also attach these reports as an appendix to this comment letter. The evaluation reports referenced here occurred without grading permits.

The crossing of watercourses can potentially affect aquatic habitat if the crossings are not properly designed and evaluated. Sediment delivery associated with land use activities can occur if geologic, meteorologic and slope conditions are not taken into consideration.

Mendocino contains several active faults including the San Andreas Fault Zone and the Maacama Fault. The location of these faults plays a role in proposed land use. Placing infrastructure over the faults can cause harm to the infrastructure, human life and the environment.

Finally, excavation and inhalation of earth materials contain **Naturally Occurring Asbestos (NOA),** and other hazardous minerals can produce hazardous working conditions. NOA and other hazardous minerals can affect the public off-site of the project through dust generated by project activities being carried to nearby residential and public use spaces.

Comments

Comment 1: Mendocino County contains areas underlain by landslides and unstable ground. The DEIR should discuss hazards associated with land use on ground containing landslides and unstable ground. The DEIR should discuss how to identify these areas, who is qualified to evaluate proposed operations in these areas, and who is qualified to recommend mitigations in these areas. https://www.conservation.ca.gov/cgs/maps-data

Comment 2: The DEIR should include discussion and mitigation regarding slope stability and proposed grading operations associated with cannabis operations. The discussion

should include both the public safety impacts and environmental impacts. The DEIR should demonstrate and discuss an understanding of the licensure and laws regarding Professional Geologists and Professional Engineers and how it applies to land use. The DEIR should discuss how mitigation of proposed projects would require adequate and independent review by California licensed professional geologists, engineering geologist and professional engineers.

Comment 3: The DEIR should include discussion and mitigation regarding seismic hazards in Mendocino County. The discussion should include both the public safety impacts and environmental impacts relative to proposed land use for cannabis production. The DEIR should demonstrate and discuss an understanding of the licensure and laws regarding Professional Geologists, Engineering Geologists and Professional Engineers and how it applies to land use. The DEIR should discuss how mitigation of proposed projects would require adequate and independent review by California licensed professional geologists, engineering geologists and professional engineers.

Comment 4: Mendocino County contains areas underlain by Naturally Occurring Asbestos (NOA). The DEIR should discuss hazards associated with land use on ground containing NOA and other hazardous minerals and gasses. The DEIR should discuss how to identify these areas, who is qualified to evaluate proposed operations in these areas, and who is qualified to recommend mitigations in these areas.
https://www.conservation.ca.gov/cgs/minerals/mineral-hazards/asbestos

Comment 5: The DEIR should recognize that the CGS manages and contains an inventory of geologic maps, landslide maps, seismic data, mineral data and other information regarding Mendocino County. CGS should be consulted regarding providing this information as needed.

For more detailed information please contact us during EIR preparation.

References:

CA 2023 Geology and Geophysical Act, accessed at https://www.bpelsg.ca.gov/laws/gg_regs.pdf.

California Geological Survey (CGS), 2007, Preliminary Engineering Geologic Review of Recent Grading, 6401 Canyon Road, Willits, CA, dated September 13, 2007.

California Geological Survey (CGS), 2010, Engineering Geologic Evaluation of 6401 Canyon Road, Willits, CA, Non-permitted activity 1-05NON-018 MEN, Case Number 07MEN 7166-48, Mendocino County, California, dated September 28, 2010.

California Geological Survey (CGS), 2010, Preliminary Focused Engineering Geologic Review of Proposed Road Grading, 900 and 1111 Doolin Canyon Drive, Ukiah, CA, Cal Fire ID 1-09NON-005 MEN, dated March 22, 2010.

Department of Cannabis Control
c/o Angela McIntire-Abbott

August 31, 2023

California Geological Survey (CGS), 2011, Engineering Geologic Assessment of Grading Operations at 29880 and 30010 Highway 101, Willits, CA; Cal Fire LE Case # 11CAMEU004127-46, dated August 11, 2011.

California Geological Survey (CGS), 2011, Engineering Geologic Assessment of Grading Operations at 29230 North Highway 101, Willits, CA; Cal Fire # 1-12NON-011 MEN dated May 30, 2011.

California Geological Survey (CGS), 2012, Engineering Geologic Assessment of Grading Operations at 70100 Arnett Drive, Leggett, CA; Cal Fire Case # 12CAMEU 005419-35, dated August 23, 2012.

8/31/2023

DocuSigned by:
David Longstreth
54F8C8D3098D441...

Date

David Longstreth, CEG 2068
Senior Engineering Geologist
Santa Rosa, California

Attachments (Appendix A)

Department of Cannabis Control
c/o Angela McIntire-Abbott

August 31, 2023

APPENDIX A

DEPARTMENT OF CONSERVATION
CALIFORNIA GEOLOGICAL SURVEY

17501 N. Highway 101 • Willits • CALIFORNIA 95490
PHONE 707/456-1814 • **FAX** 707/456-1817 • **WEBSITE** conservation.ca.gov

Memorandum

To: William Snyder, Deputy Director
California Department of Forestry
and Fire Protection
135 Ridgway Avenue
Santa Rosa, California 95401

Date: September 13, 2007

From: Department of Conservation
Division of Mines and Geology
17501 N. Highway 101
Willits, CA 95490

Subject: Preliminary Engineering Geologic Review of Recent Grading, 6401 Canyon Road, Willits, CA.

Time Spent on Review: 1h field, 1h. office

Participants-Affiliation:
Dave Longstreth – CGS

Inspection Date: September 12, 2007

County: Mendocino

Watershed: Tributary to Tomki Creek

Quadrangle: Willits 7.5' quadrangle

Legal Description: Portion of Section 12, T18N, R13W.

Reason for inspection: At the request of CDF forester Jeanette Pederson, CGS conducted a drive-by visual review of grading activities at 6401 Canyon Road, Willits, CA. On-site inspection was not conducted because of complications regarding access to the site. The purpose of the visual review is to observe possible impacts to slope stability and soil erosion that could potentially impact public safety or had the potential for delivering sediment to a watercourse. This review is to assist CDF in its investigation of a possible Forest Practice violation.

This memorandum follows a visual review of the property from Canyon Drive and does not represent an Engineering Geologic Report.

References:

Durham, J., 1979, Willits 15' Quadrangle: California Department of Forestry, Title II Geologic Data Compilation Project, Unpublished, scale 1:62,500.

Geologic Conditions:

Durham (1979) maps undifferentiated units of the Jurassic and Cretaceous age Central Belt of the Franciscan Complex as underlying the site area. The undifferentiated Central Belt of the Franciscan Complex, is described as consisting of blocks of gray-green consolidated greywacke, siltstone, mudstone, conglomerate, greenstone, chert, and schist

surrounded by a clayey matrix. The undifferentiated Central Belt is considered highly sheared and broken.

Observations:

Recent Grading. Recent road building, clearing, and grading have occurred at the site. Among these is a roughly rectangular shaped area (visually estimated to be on the order of about 100 feet wide and 200 feet long) on slopes greater than 50% that descend to an unnamed tributary to Tomki Creek in Berry Canyon. The grading appears to have removed all vegetation, leaving a bare planar slope that appears to be mantled with loose soils of unknown thickness. It appears likely that significant erosion is likely to occur as a result of next winter's rains if no erosion control work is conducted on the recently graded area, and that the potential for soil slips and mudslides that toe into the Tomki Creek tributary appears high. Canyon Road (a county road) crosses the tributary via a culvert a few hundred feet downstream of the bare rectangular area.

A driveway that provides access to the site also appears to have been recently graded. The driveway includes switchback turns across slopes estimated to be inclined more than 50% that descend to Canyon Road and has vertical cuts that are about 5 feet high. No erosion control measures were observed and it is unknown if any are installed on the portion of driveway that is out of view from Canyon Road. Drainage from the driveway has access into the tributary of Tomki Creek and will likely deliver sediment and possibly adversely impact downstream drainage facilities if proper erosion control methods are not implemented. In addition to the geologic observations, this visual review observed piles of bucked logs and branches that are precariously stored behind trees on steep slopes (50%+) that descend to Canyon Road.

Public Safety.

If sediment is eroded from the graded area it could plug down stream culvert and has a significant potential to affect Canyon Road. Downstream residents, especially the residence adjacent to the culvert crossing northwest of the subject property, may temporary loose access to the road and could possibly be flooded. The bucked wood piles placed behind trees on the steep slopes that descend to Canyon Road may roll onto the road if any windfall occurs. This appears to pose a hazard to motorist that use the road.

Recommendations:

Based on the visual review of the property from Canyon Road, CGS recommends the following:

- An on-site visit by CDF, CGS, DFG, and the Regional Water Quality Control Board to more fully evaluate potential problems at the site.
- Development of an erosion control plan for bare areas, the driveway, and other areas where grading has occur by a Professional Geologist or Professional Engineer that is reviewed by Review Team agencies, with implementation completed before this winters rainy season.
- Removal of all logs stored behind trees on the slope that descends to Canyon Drive.

CGS also recommends that a copy of this memo be provided to the Mendocino County Department of Building and Planning.

Comments to County of Mendocino:

Issues regarding slope stability and impacts to public safety and a County of Mendocino road are discussed in this memo. It is therefore suggested that the county be aware of these issues and take action as necessary to protect public safety.

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original signed by
David Longstreth, CEG # 2068
Associate Engineering Geologist

Concur
9/13/07 *original signed by*
Date, Thomas E. Spittler, CEG 1078
Senior Engineering Geologist

DEPARTMENT OF CONSERVATION
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Memorandum

To: William Snyder, Deputy Director
California Department of Forestry
and Fire Protection
135 Ridgway Avenue
Santa Rosa, California 95401

Date: March 22, 2010

From: Department of Conservation
Division of Mines and Geology
17501 N. Highway 101
Willits, CA 95490

Subject: Preliminary Focused Engineering Geologic Review of Proposed Road Grading, 900 and 1111 Doolin Canyon Drive Ukiah, CA, Cal Fire ID 1-09NON-005 MEN.

Time Spent on Review: 4h field, 8h. office

Inspection Date: March 3, 2010

County: Mendocino

Quadrangles: Ukiah and Elledge Peak 15 minute quadrangles

Participants-Affiliation:
Mrs. Carolyn Tandy – Property Owner at 900 Doolin Canyon Drive
Jeanette Pedersen – Cal Fire inspector
Dave Longstreth – CGS

Watershed: Doolin Creek, tributary to the Russian River

Legal Description: Portion of Section 30 , T15N, R12W; and Portion of Section 25 T15N, R13W, MDBL&M.

Synopsis: Reportedly 4 years ago the landowner at 1111 Doolan-Canyon Drive (Arbeeny) constructed an access road, a portion of which traverses through the adjacent property at 900 Doolan Canyon Drive (See Figures 1 and 2). The existing road contains steep pitches (ranging from 30 to 40± percent) and was constructed without permit. Based on conversation with the Mendocino County Planning Department no road rights exist that permit construction through 900 Doolan Canyon Drive. It is our understanding that the person responsible for constructing the road, Mr. Arbeeny, is attempting to have the road permitted. CAL FIRE, part of the permitting process, found the existing road to be improperly drained, resulting in sediment delivery to Doolan Creek. They also observed that the road is very steep and may not allow fire engine access (CAL FIRE's Fire Prevention staff may have to assess the road relative to Fire Safe Regulations). As such, Mr. Arbeeny hired a civil engineer who prepared plans for a new road that is less steep and located lower on site slopes (Pope Engineering, 2010). CAL FIRE requested CGS to conduct a visual review of proposed grading activities relative to possible impacts to slope stability and soil erosion that could potentially impact downstream properties (public safety) and the potential for delivering sediment to a watercourse (habitat).

References:

Blake, M.C., and Jones, D.L., 1981, *The Franciscan assemblage and related rocks in northern California*, in Ernst, W.G., editor, The geotectonic development of California – Rubey Volume I: Englewood Cliffs, New Jersey, Prentice-Hall, Inc.

Kelsey, 1998, *Formation of Inner Gorges*: Catena, Vol 15, p.433-458.

Pope Engineering, 2010, Improvement Plans, Andrew Arbeeny, 1111 Doolan Canyon Drive, Ukiah, California.

Reid et al, 2003, *Debris-flow initiation from large, slow-moving landslides*: Debris-Flow Hazards Mitigation: Mechanics, Prediction, and Assessment, Rickenmann& Chen (eds).

Swanson and Swanson, 1977, *Complex mass-movement terrains in the western Cascade Range, Oregon*: Geological Society of America, Reviews in Engineering Geology, Volume III.

Sydnor, R.H., and Sowma-Bawcom, J.A., 1991, *Landslides and Engineering Geology of the western Ukiah area, central Mendocino County, California*, Landslide Hazard Identification Map No. 24, California Division of Mines and Geology Open File Report 91-16, scale 1:6,000.

Aerial Photographs Inspected:

CDFI, 1947, Black and white aerial photographs, Roll 3, Frames 5, 6, nominal scale 1:20,000.

CVN, 1952, Black and white aerial photographs, Roll 12K, Frames 9, 10, nominal scale 1:20,000.

Cartwright,1964, Black and white aerial photographs, Mendocino County Flight, Roll 16, Frames 101, 102; nominal scale 1:20,000

CDF ALL-UK, 1981, Black and white photographs, Flight CDF ALL-UK, Roll 31, Frames 7, 8, nominal scale 1:24,000.

WAC Inc., 1984, Black and white photographs, Flight WAC-84C, Roll 15, Frames 236, 237, nominal scale 1:12,000.

WAC Inc., 1988, Black and white photographs, flight WAC CA 88, Roll 14, Frames 212, 213; nominal scale 1:31680.

WAC Inc., 1992, Black and white photographs, Flight WAC-MENDOCINO-96, Roll 29, Frames 179, 180, nominal scale 1:12,000.

WAC Inc., 2000, Black and white photographs, Flight WAC-00-CA, Roll 3, Frames 286, 287; nominal scale 1:31,680.

Geologic Conditions:

The subject properties consist of two parcels (1111 and 900 Doolan Canyon Drive, Figure 1) both of which are on steep slopes that flank Doolan Creek, a Class I tributary to the Russian River, a 303(d) listed watercourse. Sydnor and Sowma-Bawcom (1991) map Lookout Peak graywacke as underlying the site area. The Lookout Peak greywacke, part of the Jurassic and Cretaceous age Central Belt of the Franciscan Complex, is described as consisting of elongated blocks of greywacke sandstone engulfed in sheared shale. Bedrock observed during the site visit consisted of loose and pervasively jointed mudstone and greywacke sandstone. Scattered resistant boulders of what appears to be metavolcanic

rock were observed outcropping from site slopes. In general the Central Belt of the Franciscan Complex is considered sheared and broken (Blake, 1981).

A 22± acre landslide is mapped on the north facing slope that descends to Doolan Creek in the subject site area (shown on Figure 2). The landslide was interpreted by review of the historical set of aerial photographs (sets 1947 through 2000) and by hummocky topography observed at the site. The landslide, a deep-seated translational/rotational rock slide – earthflow complex is likely characterized by imperceptible and slow progressive ground deformation on a subsurface slip plane or basal shear zone. Deep-seated landslides typically toe and bulge into watercourses forming steep slopes that may be susceptible to shallow landslide movement (Reid et al, 2003).

Site slopes were observed to be steep ranging from 75 to 95± percent where they toe into Doolan Creek and evidence of shallow seated landsliding was observed during the site visit. A debris flow scar was observed on the slopes that toe into to Doolan Creek (shown on Figure 2). The slide scar appears as a an arcuate head scarp about 30 feet wide that narrows to a scour path about 5 to10 feet wide descending approximately 300 feet to Doolan Creek. The slide is vegetated with brush and grass and appears suspended at this time. The slide is visible in the 2000 areal photos, but not in the 1992 photos. Debris flows are formed by failure of water-charged soil, rock, and organic material down steep stream side slopes and channels. They commonly occur during high intensity storms. Debris may be deposited as a tangled mass of large organic material and sediment once momentum of debris is lost.

Inner gorge geomorphology was observed on the slopes that descend to Doolan Creek. Kelsey (1988) describes the formation of inner gorge geomorphology as a process where a stream down cuts through rock, resulting in an abrupt change in slope angle, with steep channel banks and upper, less steep valley slopes. In the California Coast Ranges, Kelsey (1988) describes a mechanism of inner gorge formation controlled by tectonic uplift, climate, and underlying rock characteristics. This process occurs over a geologic time scale of thousands to hundreds of thousands of years and can be temporally and physically intermittent depending on controlling factors.

The steep slopes along Doolan Creek in the subject site area appear to be underlain by weak and sheared bedrock that is inherently prone to deep-seated and shallow seated landslide processes. Human activities, such as road construction, on slopes such as these may adversely impact slope stability (Swanson, 1977). Such adverse impacts can result in accelerated land movement, additional landsliding, sediment delivery, and adverse impacts to habitat and public safety.

Proposed Road Construction: An approximately 150 foot long road is proposed to be constructed across the steep (75 to 95± percent) north facing slopes that toe into Doolan Creek (shown on Figure 2). The road is proposed to be constructed about 20 to 80 feet downslope from the existing road, which is proposed to be abandoned. The road, described by a set of plans prepared by Pope Engineering, dated February 11, 2010, presents several concerns relative to proposed construction and its impacts on slope stability and public safety (listed below):

- The construction plans appear to lack details regarding grading techniques, for example whether the road construction will utilize full bench or cut and fill grading techniques.
- The construction plans indicated that the existing road is proposed to be abandoned, however, they provide no details regarding techniques to be used to complete the abandonment.
- The uniform topography shown on the plans do not appear to reflect existing topography observed in the field.
- The plans do not include or incorporate a geotechnical analysis. Cuts and fills on steep slopes will be susceptible to failure with out proper geotechnical design. The plans do not address how the proposed road construction could affect the slope stability of the existing (upslope) road, how abandonment of the existing road may affect slope stability, or how the combination of both new road construction and existing road abandonment will affect slope stability. Such designs usually include slope stability analysis performed by both a California Certified Engineering Geologist and Licensed Geotechnial Engineer.

Existing access road. Based on site observations several concerns regarding the existing access road regarding were noted and are listed below:

- The road crosses Doolin Creek with a low lying bridge that appears to be constructed with a railroad car or flat bed truck base and logs. The bridge does not appear to be supported by foundations and lies on ground that appears to be subject to stream side erosion and scour (see photograph 1). Eventual failure and collapse of the bridge appears possible without additional design and repair.
- The existing access road ascends from the bridge at a steep gradient (greater than 30 percent), is paved with asphalt, insloped, and appears to have minor to moderate erosion along the inside portion of the road (photograph 2). The road that enters the Arbeeny parcel, is unpaved, and traverses across 75 to 95 percent slopes for several hundred feet before switch backing to a few building pads (photograph 3). The unpaved portion of road appears to be eroding and delivering sediment on the order of tens to hundreds of cubic yards to Doolan Creek, a Class I watercourse. No erosion control measures appear to be in place and additional sediment delivery appears likely. The lower paved portion of existing road appears relatively more stable than the unpaved upper portion of existing road.

Domestic Water Supply. A domestic water supply is located in Doolan Creek directly below the proposed construction. The water supply consists of a pipe that gravity feeds water to a tank that supplies water to downstream residents. Reportedly the water is used for irrigation purposes. The Domestic Water Supply located in Doolan Creek, directly below the proposed construction, appears at risk from landsliding or rock failure.

Public Safety. The residences down stream of the proposed construction appear to be at hazard from landsliding, flooding, mudslides, and other adverse impacts that could be initiated by the propose construction activities. This includes the residence at 900 Doolan Canyon Drive.

Recommendations:

Based on the visual review of the subject properties, CGS recommends the following:

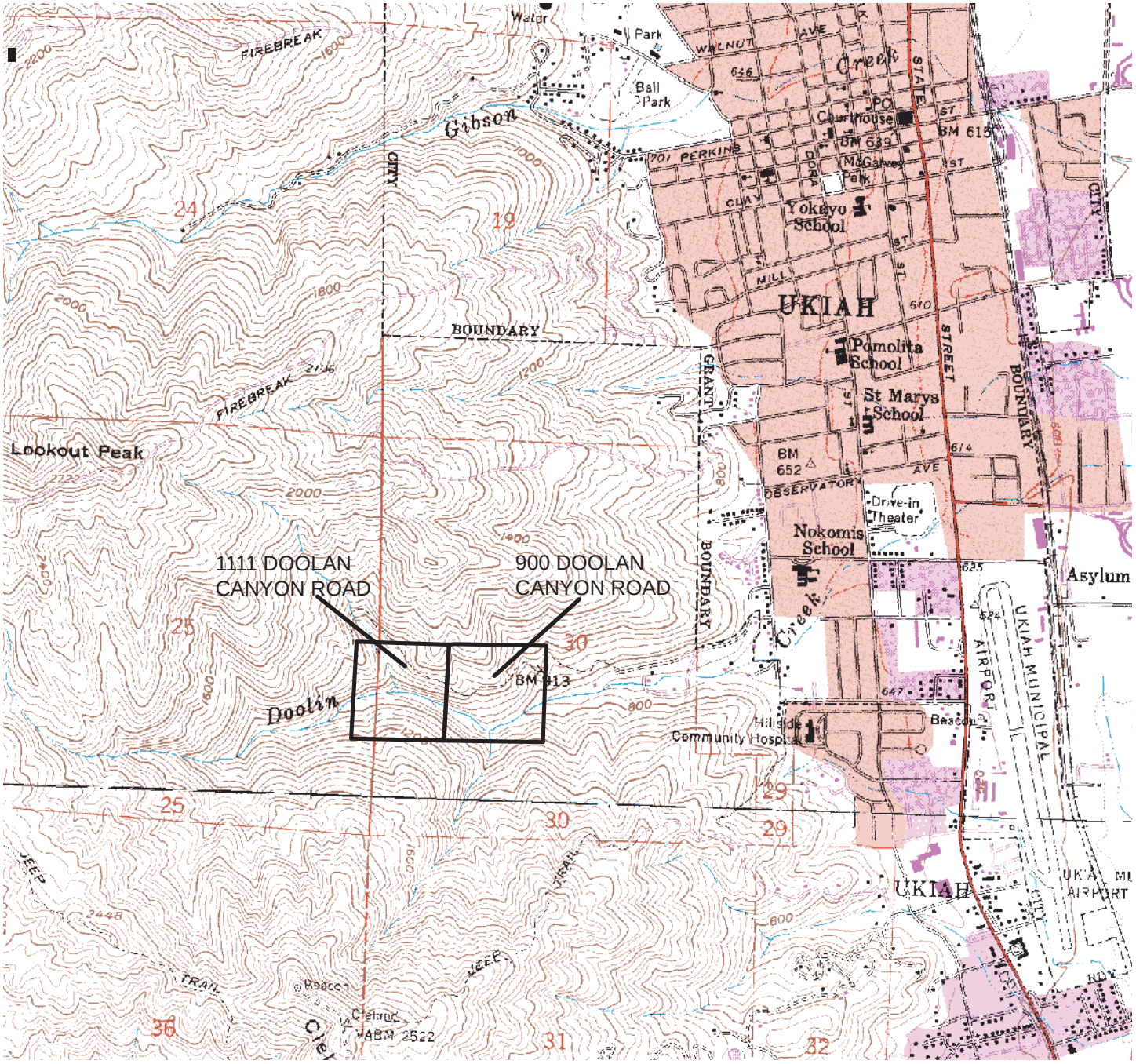
- The proposed road as currently designed by Pope Engineering (2010) is inadequate and should not be permitted.
- A detailed geologic investigation of site slope including subsurface investigation should be conducted relative to the proposed road construction and abandonment of the existing road.
- A detailed geotechnical analysis of the proposed road construction and existing road abandonment that includes laboratory testing of rock strength and a slope stability analysis should be conducted. Such analysis should include cut slope stability and fill slope stability, including detailed and accurate cross sections that illustrate existing and proposed conditions.
- Prior to approval by the County of Mendocino the geotechnical and geologic reports should receive independent third party review.
- Development of an erosion control plan for existing access road should be conducted. The erosion control plan should be prepared by a Professional Geologist or Professional Engineer and should be reviewed by Review Team agencies.
- The existing bridge is inadequately supported and should be removed before failure or upgraded to county standards.
- A copy of this memo should be provided to the Mendocino County Department of Building and Planning and downstream residents.

Comments to County of Mendocino:

Issues regarding slope stability and impacts to public safety are discussed in this memo. It is therefore suggested that the county be aware of these issues and take action as necessary to protect public safety.

original signed by
David Longstreth, CEG # 2068
Certified Engineering Geologist

Concur
03-22-10 original signed by
Date, Thomas E. Spittler, CEG 1078
Senior Engineering Geologist



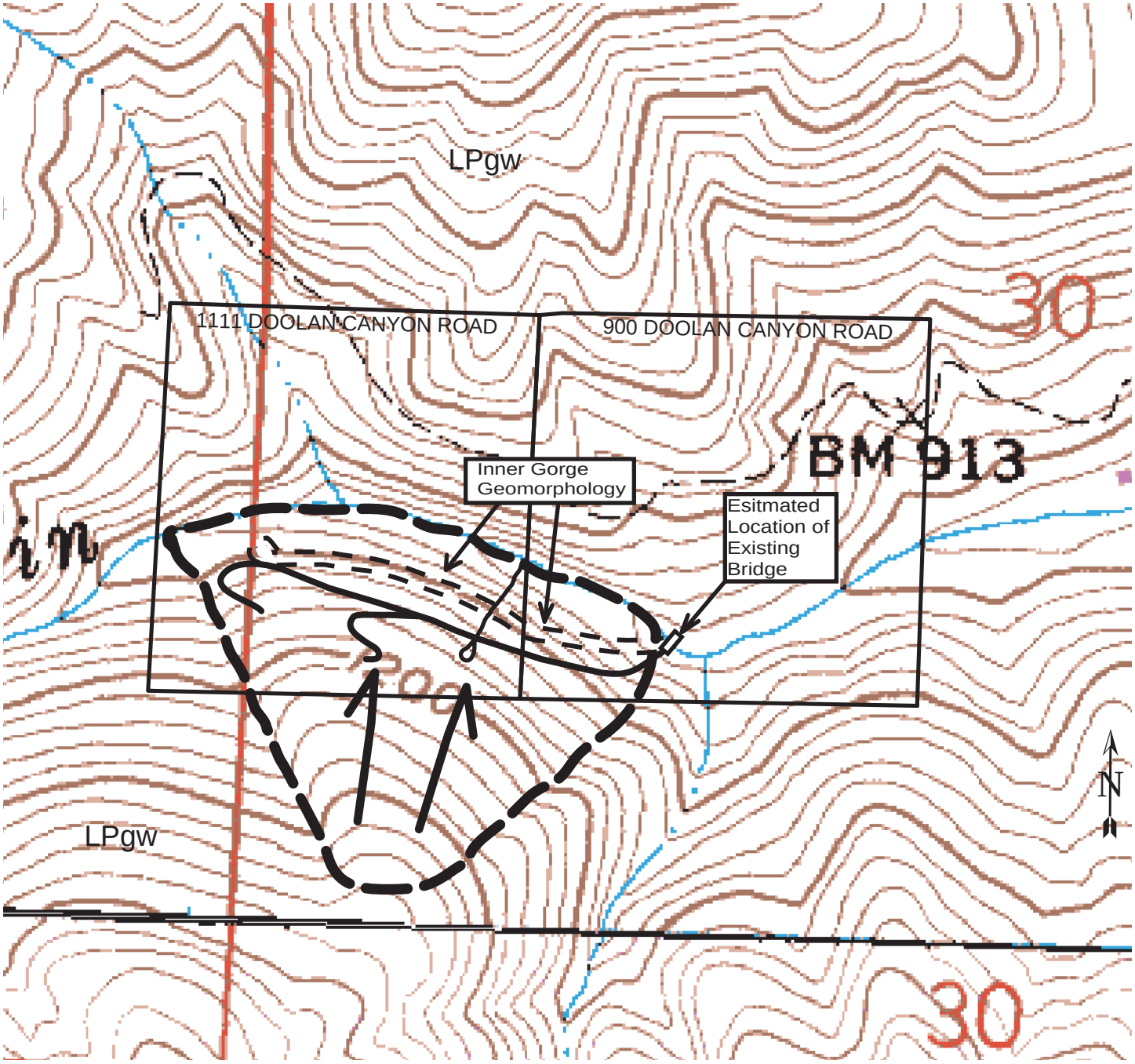
Explanation

= Estimated Parcel Boundary

N

Base Maps: Portions of Ukiah and Elledge Peak 7.5 Minute USGS Quadrangles, photorevised 1975.

Date: March 2010	Location Map To Accompany Engineering Geologic Review of Proposed Road through the Properties at 900 and 1111 Doolan Canyon Road	Figure: 1
Scale: 1" = 2000'		
0 1000' 2000'		



Explanation

Rotational/Translational Landslide

Estimated Location of Proposed Road

Estimated Parcel Boundary

Debris Flow/Torrent Track

Estimated Location of Existing Road

LPgw = Lookout Peak graywacke

Date: March 2010 Scale: 1" = 500' 0 250' 500'	Site Map To Accompany Engineering Geologic Review of Proposed Road Through Properties at 900 and 1111 Doolan Canyon Road, Ukiah, CA	Figure: 2

Photograph 1. Existing Bridge at 900 Doolan Canyon Drive.
Photograph by CGS, March 3, 2010

Photograph 2. Paved road ascending from bridge.
Photograph by CGS, March 3, 2010.

No Scale	1-09NON-005 MEN, Photographs 1 and 2.	Figure: 3

Photograph 3. Erosion on existing unpaved access road,
1111 Doolan Canyon Drive. Photograph by CGS, March 3, 2010.

No Scale	1-09NON-005 MEN, Photograph 3.	Figure: 4

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Memorandum

To: Jeanette Pedersen
California Department of Forestry
and Fire Protection
17501 N. Highway 101
Willits, CA 95490

Date: September 28, 2010

From: Dave Longstreth
Department of Conservation
Division of Mines and Geology
17501 N. Highway 101
Willits, CA 95490

Subject: 6401 Canyon Road, Willits, CA, Non-permitted activity 1-05NON-018 MEN, Case Number 07MEN 7166-48

Pursuant to your request the following is a brief introduction of the concept of slope stability and observed conditions that affect slope stability at the subject site.

Introduction: Slope stability can be thought of as the factors that tend to keep a hillslope in place (for example friction, competent rock strength, and low slope gradients) versus factors that tend to cause a hillslope to fail (for example the force of gravity, water, and steep slope gradients).

Excavating (digging) into a slope can adversely impacts slope stability by undermining or removing support from material above the area of excavation.

Placing fill materials on or above steep slopes can adversely impacts slope stability by increasing the mass on steep slopes.

The introduction of water (**ponding**) into the ground can adversely impact slope stability by saturating and weakening the internal strength of the underlying earth materials.

Observed Conditions:

- Approximately 500 to 700 cubic yards (50 to 70 dump truck loads) of earth materials have been **excavated** (cut) from an existing cut bank and **placed** near the top of a slope that descends to Canyon Road, a Mendocino County road. Site slopes contain ground cracks and appear unstable.
- The earth materials have been used to form a dam that **ponds** water. The water likely percolates through the slopes that descend to Canyon Road and saturates the underlying slope materials. When soil gets over-saturated it loses cohesion and becomes too heavy to support itself. With the aid of gravity the soil will slide down the hillside.
- The eastern portion of the property appears to be slowly and actively moving. The unstable slopes descend to Canyon Road where a portion of the road appears to have been moved (offset) about 4 inches.

Risks:

The potential failure of site slopes onto Canyon Road poses a risk to the safety and welfare of persons that use the road. Slope failure will likely incur costs required to open the road and make it safe. The potential failure of slopes within the site poses a risk to the existing house and inhabitants.

Recommendations:

1) The recommendation provided in CGS (2010) should be followed.
2) The area of grading adjacent to the house should be evaluated by a licensed engineering geologist and civil engineer with regards to reconfiguring the hillslope to conditions with less adverse impacts to slope stability. This would likely require a "Slope Stability Analysis". Review and approval of the analysis should be conducted by the State or an independent third party that is selected by the State or the County of Mendocino.
3) Water should not be allowed to pond and percolate into site slopes. Water should be evenly disperse or directed to a location that will not adversely impact slope stability.
4) The eastern portion of the property should have a "Geologic Hazard Zone" (GHZ) indicated on the property deed. The purpose of the GHZ would be to identify existing or potential geological hazards and to restrict development (grading) in the interests of preventing hazards from causing harm to people or property. Normally the GHZ is shown on the deed map and included in the surveyed legal description. The GHZ stays attached to the property even if it is sold.

References:

California Geological Survey (CGS), 2010, Supplementary Engineering Geologic Inspection of Non-permitted activity 1-05NON-018 MEN, Case Number 07MEN 7166-48, 6401 Canyon Road, Willits, CA: Memorandum to William Snyder, Deputy Director, California Department of Forestry and Fire Protection by David Longstreth, 5 p., dated September 13, 2007.

original signed by
David Longstreth, CEG # 2068
Certified Engineering Geologist

DEPARTMENT OF CONSERVATION

CALIFORNIA GEOLOGICAL SURVEY

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Memorandum

To: Jeanette Pedersen
California Department of Forestry
and Fire Protection
17501 N. Highway 101
Willits, CA 95490

Date: August 11, 2011

From: David Longstreth
Department of Conservation
California Geological Survey
17501 N. Highway 101
Willits, CA 95490

Subject: Engineering Geologic Assessment of Grading Operations at 29880 and 30010 Highway 101, Willits, CA; Cal Fire LE Case # 11CAMEU004127-46

References:

California Forest Practice Rules (CFPR), 2011. Incl. the Z'Berg-Nejedly Forest Practice Act of 1973. California Department of Forestry & Fire Protection, Resource Management, Forest Practice Program, PO Box 944246, Sacramento, CA 94244-2460.

California Building Code (CBC), 2010 (IBC 2009), Appendix J. GRADING.

Kelsey, H.M.,1998, *Formation of Inner Gorges*: Catena, Vol 15, p.433-458.

Kilbourne, R.T., 1984 A, Geology and Geomorphic Features Related to Landsliding, Longvale 7.5' Quadrangle, Mendocino County, California: California Division of Mines and Geology Open File Report 84-18, scale 1:24,000.

Kilbourne, R.T., 1984 B, Geology and Geomorphic Features Related to Landsliding, Willits NW (Burbeck) 7.5' Quadrangle, Mendocino County, California: California Division of Mines and Geology Open File Report 84-19, scale 1:24,000.

Pampeyan, E.H., and others, 1981, *Preliminary Map Showing Recently Active Breaks Along the Maacama Fault Zone Between Laytonville and Hopland, Mendocino County, California*, USGS, Map MF-1217.

Reid, M.E., et al, 2003, *Debris-flow initiation from large, slow-moving landslides*: Debris-Flow Hazards Mitigation: Mechanics, Prediction, and Assessment, Rickenmann& Chen (eds).

Scullin, C.M., 1990, *Excavation and Grading Code Administration, Inspection, and Enforcement, Prentice-Hall*, Englewood Cliffs, New Jersey.

Swanson, F.J., and Swanston, D.N., 1977, *Complex mass-movement terrains in the western Cascade Range, Oregon*: Geological Society of America, Reviews in Engineering Geology, Volume III.

Aerial Photographs Inspected:

CDFI, 1947, Black and white aerial photographs, Roll 6, Frames 2, 3, nominal scale 1:20,000.

CVN, 1952, Black and white aerial photographs, Roll 9K, Frames 124, 125, nominal scale 1:20,000.

Cartwright,1963, Black and white aerial photographs, Mendocino County Flight, Roll 3, Frames 156, 157; 158; nominal scale 1:20,000

CDF ALL-UK, 1981, Black and white photographs, Flight CDF ALL-UK, Roll 26, Frames 2, 3, nominal scale 1:24,000.

WAC Inc., 1984, Black and white photographs, Flight WAC-84C, Roll 15, Frames 167, 168, nominal scale 1:12,000.

WAC Inc., 1988, Black and white photographs, flight WAC CA 88, Roll 15, Frames 94, 95; nominal scale 1:31680.

WAC Inc., 2000, Black and white photographs, Flight WAC-00-CA, Roll 2, Frames 99, 100; nominal scale 1:31,680.

Introduction:

The California Geological Survey (CGS) was requested by CALFIRE to evaluate reported grading operations conducted at 29880 and 30010 Highway 101, Willits, CA., on slopes inclined up to 80 percent and more. A July 8, 2011 site visit was attended by Rusty Boccaleoni (CDFG), Stormer Feiler (NCRWQCB), Bob Scaglione (AQMD), Jim McCleary (County of Mendocino Code Enforcement), Ray Madrigal (County of Mendocino Code Enforcement), Jeanette Pedersen (CAL FIRE), Craig Pedersen (CAL FIRE), Lou Sciocchetti (CAL FIRE), Tim Meyers (CAL FIRE), Andy Whitlock (CAL FIRE) and Dave Longstreth (CGS).

Geologic Conditions:

The subject properties consist of two adjacent parcels (29880 and 30010 Highway 101, Willits, California) both of which are on steep slopes that drain to tributaries of Outlet Creek, a 303d listed tributary to the Eel River. The slopes are underlain by Upper Cretaceous to Tertiary age Coastal Belt of the Franciscan Complex (Kilbourne, 1984 A and B, Figure 1) that is described as gray-green consolidated sandstone containing scattered interbeds of siltstone, shale, and conglomerate. Where observed bedrock generally consisted of gray brown to orange brown sandstone that appeared pervasively jointed.

Review of aerial photographs (sets 1947, 1952, 1963, 1981, 1984, 1988, 2000) suggest that the steep stream side slopes (70 to 90 percent) that flank drainages within the site area appear as debris slide slopes, a geomorphic feature characterized by an aggregate of debris slide scars left by the movement of predominantly unconsolidated rock, colluvium, and soil along relatively shallow failure planes. Additionally two deep-seated landslides interpreted by review of the historical set of aerial photographs (sets 1947 through 2000) and by hummocky topography are observed at the site. The landslides, which appear to be translational/rotational rock slides, are likely characterized by very slow progressive ground deformation on a subsurface slip plane or basal shear zone. Deep-seated landslides often toe into watercourses forming steep slopes that may be susceptible to shallow landsliding (Reid et al, 2003).

Site slopes were observed to be steep ranging from 70 to 90± percent where they toe into an unnamed watercourse that flow to Reeves Canyon. Inner gorge geomorphology was observed on the slopes that flank site drainages. Kelsey (1988) describes the formation of inner gorge geomorphology as a process where a stream down cuts through rock, resulting in an abrupt change in slope angle, with steep channel banks and upper, less steep valley slopes. In the California Coast Ranges, Kelsey (1988) describes a mechanism of inner gorge formation

controlled by tectonic uplift, climate, and underlying rock characteristics. This process occurs over a geologic time scale of thousands to hundreds of thousands of years and can be temporally and physically intermittent depending on controlling factors.

A lineament of the active Maacama fault zone is mapped as trending through the site area (Pampeyan and others, 1981, Figure 2) that parallels the northwest trending ridge system along the western margin of the site area. This suggests the bedrock in the area may be sheared and broken from fault movements. The steep slopes observed in the subject site area appear to be underlain by pervasively jointed and sheared bedrock that is inherently prone to deep-seated and shallow seated landslide processes. Human activities such as road construction and grading may adversely impact slope stability (Swanson and Swanston, 1977) on slopes such as these. Such adverse impacts can result in accelerated land movement, additional landsliding, sediment delivery, and adverse impacts to habitat and public safety.

Observations. (keyed to Figures 3, 4, 5, 6, 7).

Pad Area #1. The southern approximately 1.8 acre pad was constructed on a northeast trending spur ridge (Figures 4 and 5). Materials cut from the ridge nose were side cast on the ridge flanks. The fill is estimated to be a maximum of about 20 to 25 feet thick and it is estimated to be on the order of about 15,000 cubic yards of materials. Organic debris (for example tree stumps, brush, and logs) were observed protruding out of the fill. In many places the organic debris was observed to be in positions that appeared to be supporting the fill materials. The fills do not appear to have been founded, keyed into, or placed on firm soils or bedrock. The fills appear very loose and uncompacted. Fills are perched on 80 percent slopes that descend to watercourses that flow to Highway 101. Review of aerial photographs (sets 1947 through 2000) indicate that while roads or skid trails were constructed in the area of the pad in the 1980s, no pad area was present prior to the 2000 aerial photographs.

A house pad with what appears to be a manufactured home is located immediately below and northeast of Pad Area #1 (Figure 3). This is immediately below what is estimated to be the thickest fill slopes at the northeast end of Pad #1.

Pad Area 2. The northern 0.6± acres pad was constructed on a northeast facing slope (Figure 6). Fills estimated to range from from about 10 to 20 feet thick appear to have been side cast on the slope. It is estimated that roughly 2500 cubic yards of fill materials were generated. Organic debris (for example tree stumps, brush, and logs) was observed protruding out of the fill. In many places the organic debris was observed to be in positions that appeared to be supporting the fill materials. The fills do not appear to have been founded, keyed into, or placed on firm soils or bedrock. The fills appear very loose and uncompacted. The fills are perched on 80 percent slopes that descend to Highway 101. Review of aerial photographs (sets 1947 through 2000) indicates that a smaller pad area was constructed in this area in the 1980s and was enlarged sometime after the 2000 photographs were taken.

Road Reconstruction. An approximately 1300-foot long driveway constructed at a 30 percent gradient leads from the pad areas to Highway 101 (Figure 7). The driveway appears to have been pre-existing and recently reconstructed. The driveway contains an outside berm and appears undrained for approximately 1300 feet before reaching Highway 101.

Cutting and filling appears to have recently occurred at the top of the driveway. What appears to be approximately 300 to 400 cubic yards of side cast materials were placed onto 90 percent slopes that descend to a watercourse channel. The side cast fills extend from the driveway all the way to the channel (approximately 100 feet) and have resulted in sediment in the watercourse. The watercourse flows to an on-site domestic water supply and eventually to an approximately 42-inch diameter culvert that flows under Highway 101 (Figure 7). The culvert was observed to be about half filled with sediment at the time of the inspection.

Environmental and Public Safety Concerns.

1). Grading. It appears that the grading techniques used to construct the pad fills were conducted in a manner that is considered unstable and not safe from failure (CFPR, 2011; CBC, 2010; Scullin, 1990). As such, there appears to be a significant potential that if the fills used in the pad constructions become saturated the fill slopes will fail. This would likely impact downslope watercourses, the downslope house pad, site driveway and Highway 101. This could impact the health and well fare of inhabitants of the house immediately below Pad #1 and could result damage to utilities on the site, such as fuels or other toxic materials potentially stored on site that could potentially contaminate ground water. Saturation of the uncompacted fills could occur from irrigation of vegetation of plants on the pad and/or from winter rains.

2). Driveway Drainage. The existing reconstructed driveway appears undrained and if left in its current condition, runoff from it appears to be in a position to flow onto Highway 101. This could result in sediment deposition onto Highway 101 and could adversely impact the safety of the motorists that use the highway.

3). Highway 101 Culvert. The approximately 42-inch diameter culvert that flows under Highway 101 could become plugged if fills that have been side cast into the watercourse channel at the top of the driveway are not removed from the channel. If the culvert plugs, water will likely pond along fills used to construct Highway 101 and eventually flow across the highway. This could adversely impact stability of Highway 101 and the safety of the motorists that use it.

4). Irrigation. Irrigation of plants on the pad areas could lead to percolation of water into loose fill and bedrock exposed on the pad surface and could result in adverse impacts to slope stability of the slopes on the site.

Recommendations:

A mitigation plan shall be developed by a California Certified Engineering Geologist (CEG) and a licensed Geotechnical Engineer. The mitigation plan shall include but not be limited to:

- A CEG and Geotechnical Engineering shall evaluate the adequacy of grading techniques and the stability of on-site cuts and fill, including an evaluation of potential impacts resulting from failure of slopes to the house pad immediately below Pad #1. The evaluation shall also address potential impacts related to the reconstructed driveway, and potential impacts to downslope drainages, watercourse, and Highway 101. The mitigation plan shall include a map that identifies the locations of unstable fills and slopes and shall include a finding by the project CEG regarding the stability of existing fill slopes.
- The geotechnical engineer shall provide mitigations and designs that include remediation of unstable fills that includes but is not limited to a grading plan that outlines

corrective grading designs. The corrective grading plan and designs will likely require the removal and possible re-compaction of unstable fills and shall be designed by the geotechnical engineer in such a way to minimize potential adverse impacts to slope stability identified by the CEG.

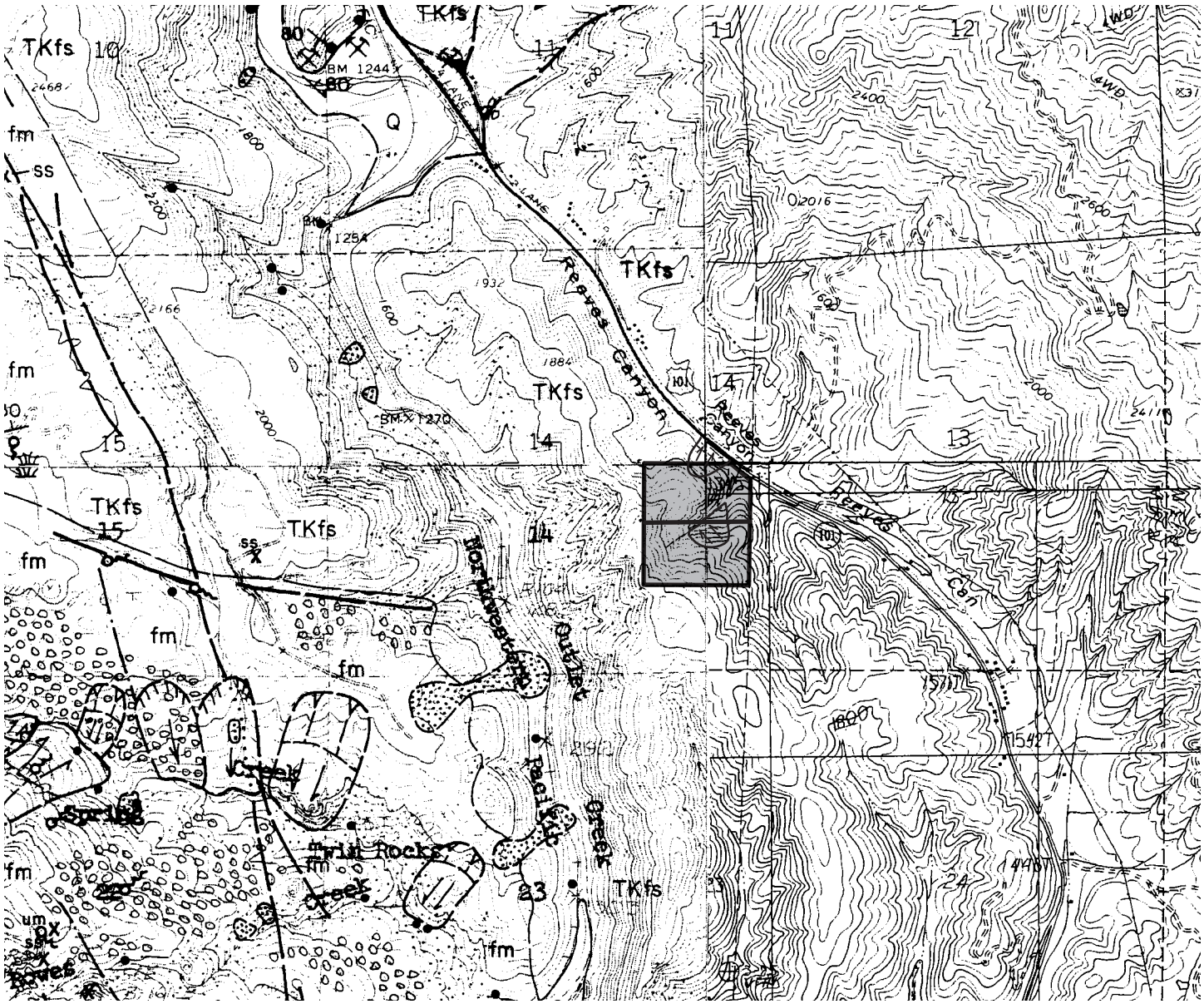
- Cal Trans shall be notified of potential impacts to Highway 101 and the 42-inch diameter culvert that runs under the highway and have the opportunity to comment or participate in any mitigations to Highway 101.
- A geotechnical engineering or CEG shall provide mitigation and design that de-waters and drains the site driveway. This can be included on the corrective grading plan that is developed for site remediation.
- A CEG shall evaluate potential impacts to slope stability resulting from irrigation of plants placed on the pad areas and the potential for percolation of water into bedrock, unstable fills, and along the bedrock/fill contact.
- The mitigation plan shall include a time frame that outlines completion of mitigations prior to commencement of the 2011 fall/winter rains and shall include a schedule of post-remediation inspections.
- CGS shall review and provide recommendations to Cal Fire regarding the approval of the mitigation plan prior to implementation.

Disclosure: This memo should in no way be considered an Engineering Geologic Report and should not be substituted in any way for such evaluations and reports recommended and requested in this memo.

original signed by
David Longstreth, CEG # 2068
Certified Engineering Geologist

Concur
08-11-11 *original signed by*
Date, Thomas E. Spittler, CEG 1078
Senior Engineering Geologist

Attachments: Figures 1, 2, 3, 4, 5, 6, and 7.



Explanation

Q	Alluvium
TKfs	Franciscan Formation, coastal belt

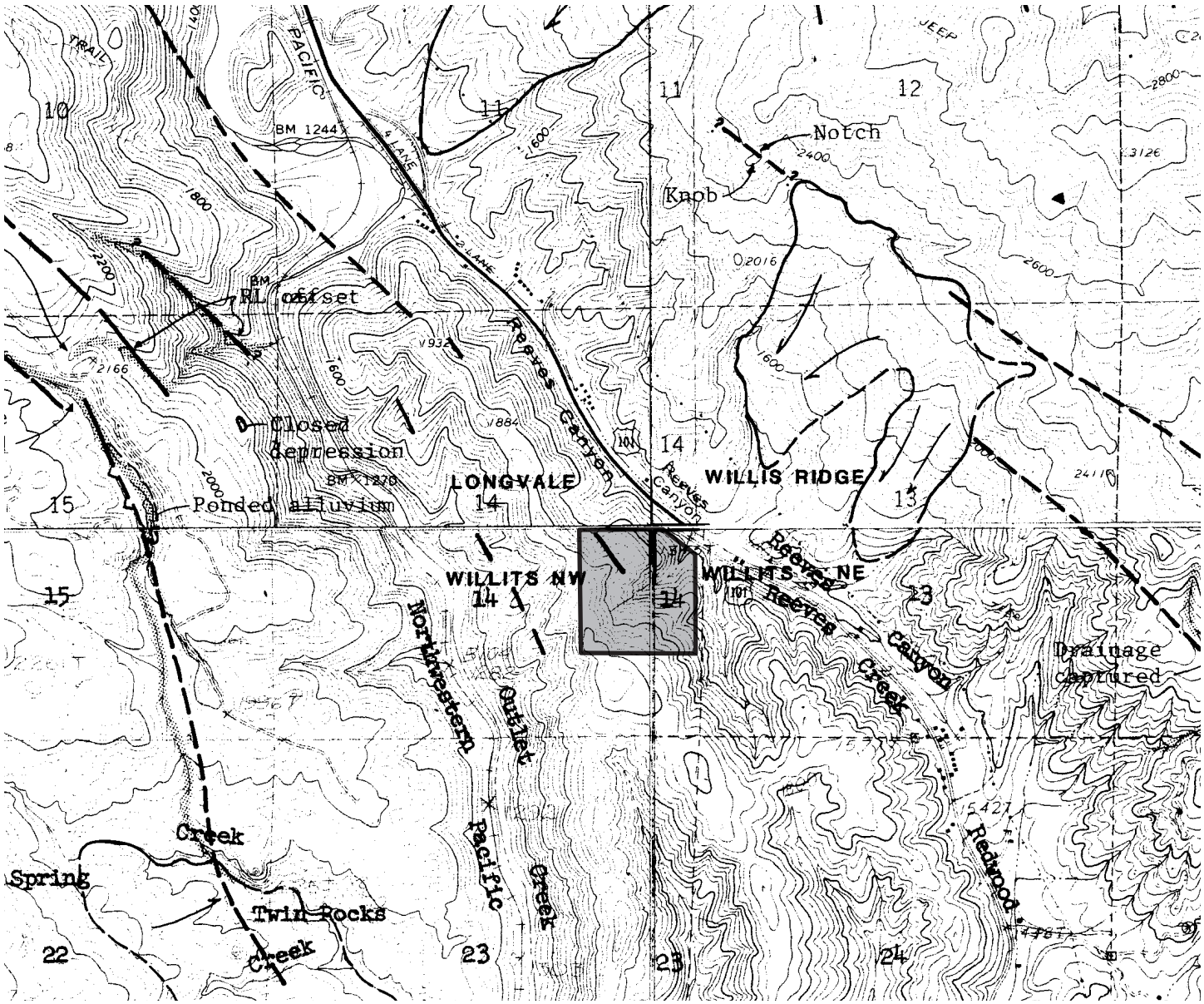
N

0 1000' 2000'

Base Map: Modified from Kilbourne, R.T., 1984 A, Geology and Geomorphic Features Related to Landsliding, Longvale 7.5' Quadrangle, Mendocino County, California: California Division of Mines and Geology Open File Report 84-18, scale 1:24,000 and Kilbourne, R.T., 1984 B, Geology and Geomorphic Features Related to Landsliding, Willits NW (Burbeck) 7.5' Quadrangle, Mendocino County, California: California Division of Mines and Geology Open File Report 84-19, scale 1:24,000.

- Geologic contact, dashed where approximately located
- Fault
- Rotational/Translational Landslide
- Active Landslide (too small to show at map scale)
- Earthflow
- Disrupted ground
- Debris Slide
- Slopes >70 percent
- Debris Flow/Torrent Track
- 75 Strike and dip of bedding
- Debris Slide Amphitheater/ Slope
- Shaded area represents estimated limits of investigation area.

Date: Aug 2011	Regional Geologic Map To Accompany Engineering Geologic Review of LE Case # 11CAMUE004127-46	Figure: 1
Scale: 1" =2000'		



Explanation

Obvious photogeologic or field evidence of recent movement.

Less obvious photogeologic or field evidence of recent movement, but very probably a fault break.

Lineament inferred to be a recent fault break based on alinement of topographic features, but evidence of recent movement is inconclusive.

Shaded area represents estimated limits of site area.

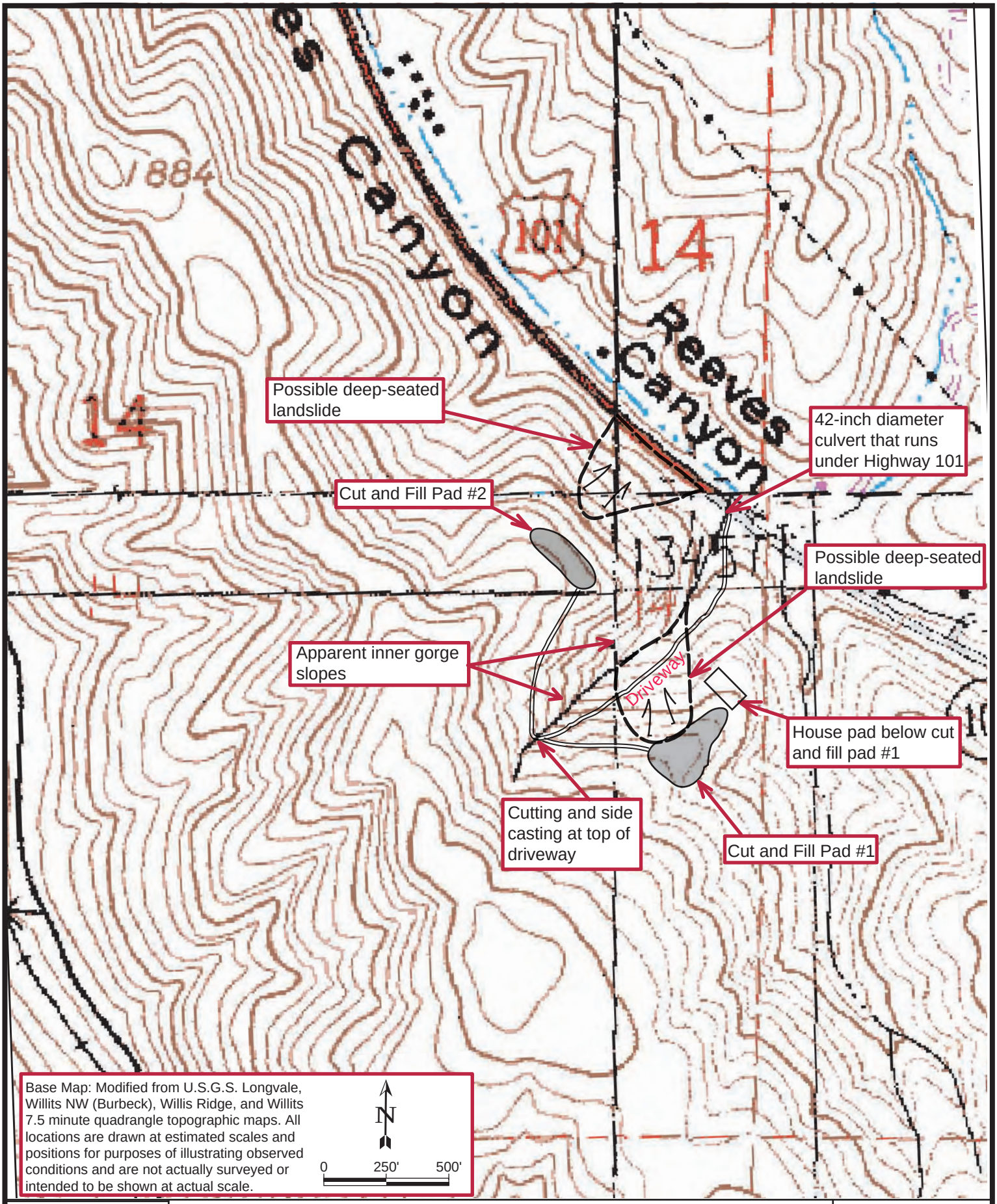
N

0 1000' 2000'

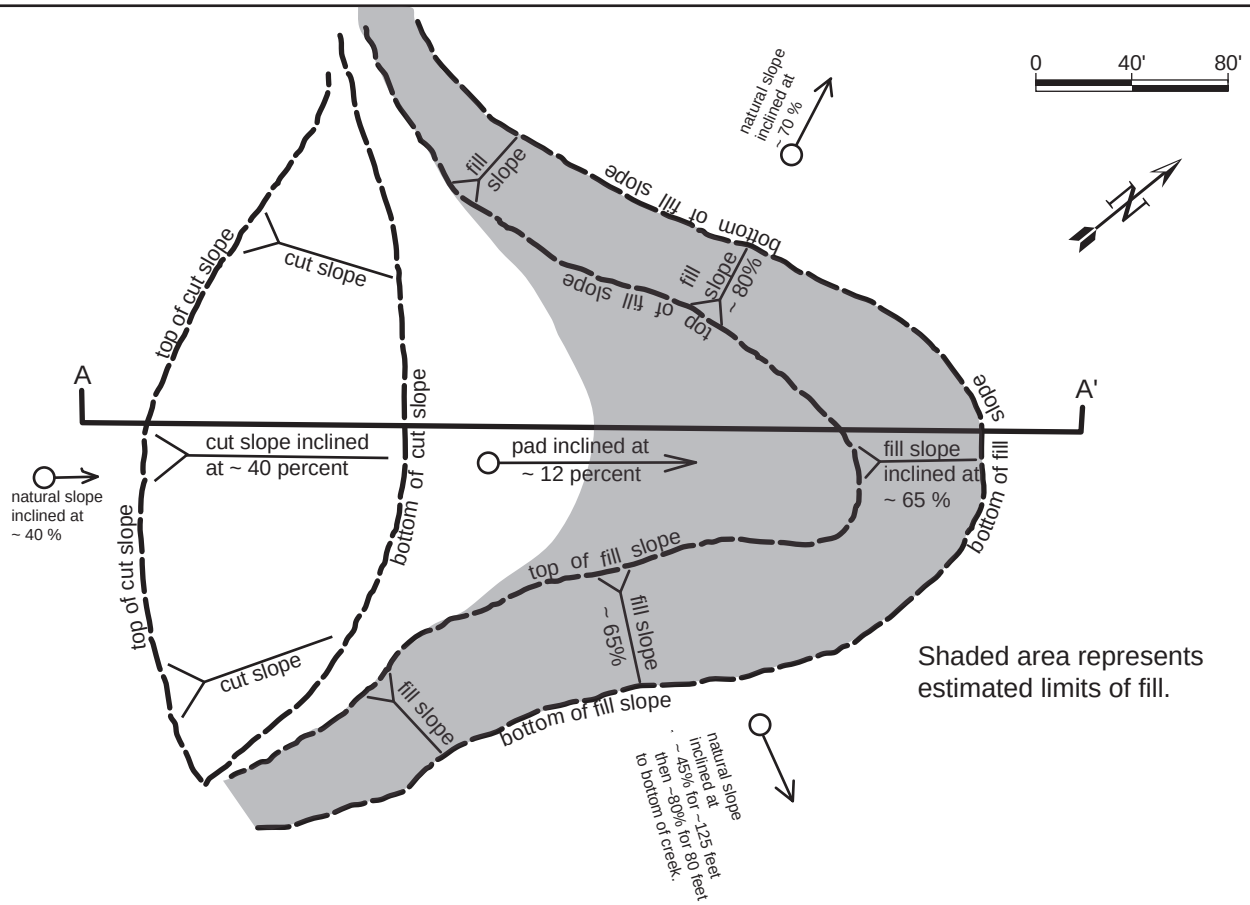
feet

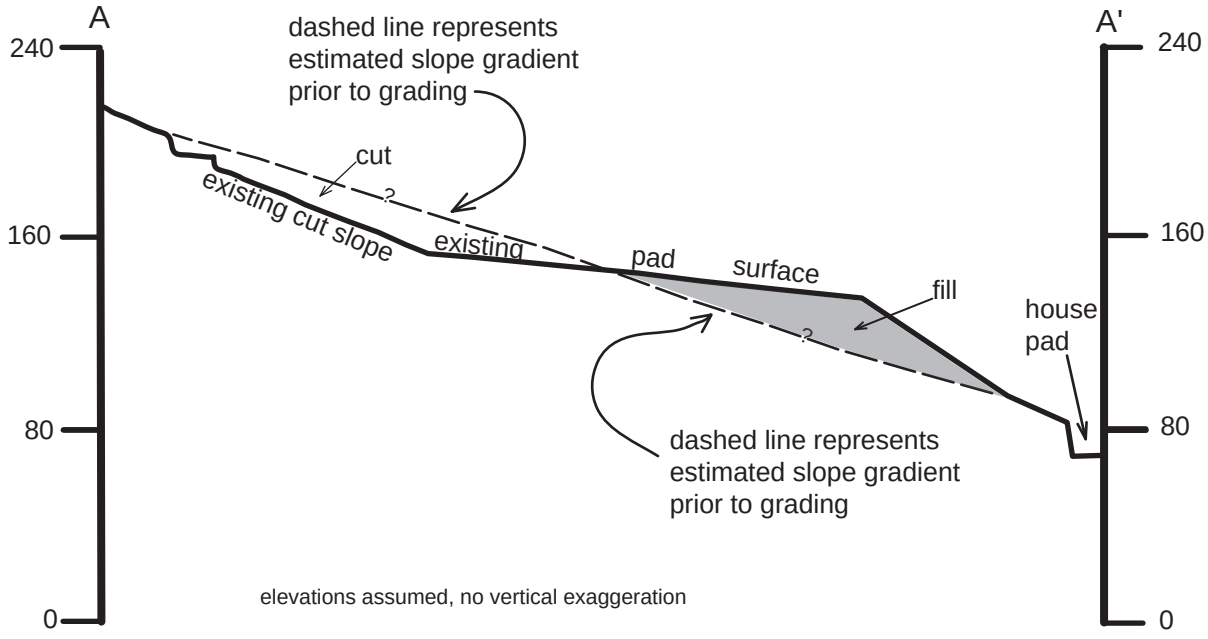
Base Map: Modified from Pampeyan and others, 1981, Preliminary Map Showing Recently Active Breaks Along the Maacama Fault Zone Between Laytonville and Hopland, Mendocino County, California, USGS, Map MF-1217.

Date: Aug 2011 Scale: 1" =2000'	Regional Geologic Map To Accompany Engineering Geologic Review of LE Case # 11CAMUE004127-46	Figure: 2



Scale: 1" = 500'	Site Map To Accompany Preliminary Engineering Geologic Review of LE Case # 11CAMUE004127-46	Figure: 3





Locations and positions shown on sketch map and sketch cross section are drawn at estimated scales, positions, and thicknesses for purposes of illustrating observed conditions and are not actually surveyed or intended to be shown at actual scale.

Scale: 1" ~ 80'	Sketch map and cross section of cut and fill pad # 1 LE Case # 11CAMUE004127-46	Figure: 4

Bottom of fill slope along pad 1.

Buried debris exposed in fill slope along pad 1

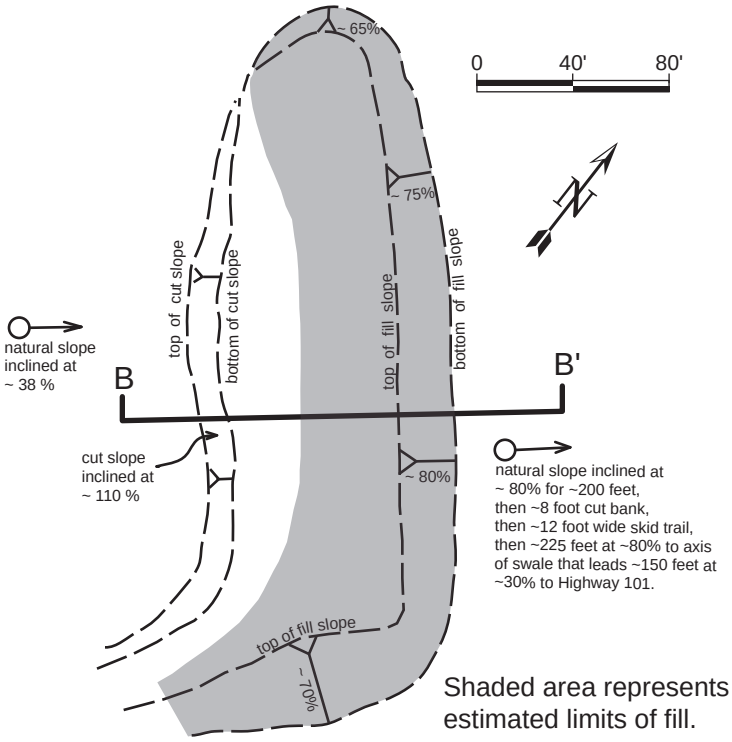
House pad immediately below pad 1.

Debris exposed in fill slope along pad 1.

Northeast panoramic view of pad 1 taken on cut slope.

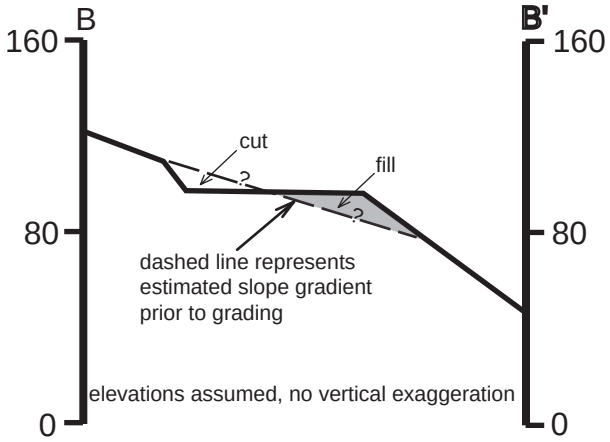
Southwest panoramic view taken from northeast margin of pad 1 looking towards cut slope.

No Scale	Photographs taken of cut and fill pad # 1 LE Case # 11CAMUE004127-46	Figure: 5



Northwest view of pad 2, cut bank excavation

Southeast view of pad 2



View southeast along pad 2 fill slope.

Facing east taken from above cut slope at pad 2.

Locations and positions shown on sketch map and sketch cross section are drawn at estimated scales, positions, and thicknesses for purposes of illustrating observed conditions and are not actually surveyed or intended to be shown at actual scale.

Scale: 1" = 80'	Sketch map and cross section of cut and fill pad # 2 LE Case # 11CAMUE004127-46	Figure: 6

Half plugged ~ 42" culvert under Highway 101

Driveway that descends to Highway 101 (in distance).

Excavation at top of driveway from which sidecast fill appear to have been generated.

View of driveway ascending from Highway 101.

Loose sidecast on ~90% slopes into creek generated from excavation at top of driveway.

Midslope portion of undrained driveway that contains an outside berm.

No Scale	Photographs taken of driveway and culvert under Highway 101, LE Case # 11CAMUE004127-46	Figure: 7

DEPARTMENT OF CONSERVATION

CALIFORNIA GEOLOGICAL SURVEY

801 K STREET • MS 13-40 • SACRAMENTO, CALIFORNIA 95814

PHONE 916 / 327-0791 • **FAX** 916 / 323-9264 • **TDD** 916 / 324-2555 • **WEB SITE** conservation.ca.gov

Memorandum

To: Jeanette Pedersen
California Department of Forestry
and Fire Protection
17501 N. Highway 101
Willits, CA 95490

Date: May 30, 2012

From: David Longstreth
Department of Conservation
California Geological Survey
17501 N. Highway 101
Willits, CA 95490

Subject: Engineering Geologic Assessment of Grading Operations at 29230 North Highway 101, Willits, CA; Cal Fire # 1-12NON-011 MEN.

References:

Durham, J., 1979, Willits 15' Quadrangle: California Department of Forestry, Title II Geologic Data Compilation Project, Unpublished, scale 1:62,500.

Pampeyan, E.H., and others, 1981, *Preliminary Map Showing Recently Active Breaks Along the Maacama Fault Zone Between Laytonville and Hopland, Mendocino County, California*, USGS, Map MF-1217.

Aerial Photographs Inspected:

Cartwright,1963, Black and white aerial photographs, Mendocino County Flight, Roll 3, Frames 157; 158; nominal scale 1:20,000

WAC Inc., 1988, Black and white photographs, flight WAC CA 88, Roll 15, Frames 93, 94; nominal scale 1:31680.

WAC Inc., 2000, Black and white photographs, Flight WAC-00-CA, Roll 2, Frames 98, 99, nominal scale 1:31,680.

Introduction:

The California Geological Survey (CGS) was requested by CALFIRE to evaluate reported grading operations conducted at 29230 Highway 101, Willits, CA, on slopes inclined up to 80 percent. A May 24, 2012 site visit was attended by Bob Scaglione (AQMD), Jeanette Pedersen (CAL FIRE), Tim Meyers (CAL FIRE), and Dave Longstreth (CGS).

Geologic Conditions:

The subject properties consist of an approximately 4 acre parcel (29230 Highway 101, Willits, California) located on steep slopes that drain to the headwaters of Lower Outlet Creek and Ryan Creek, both 303d listed tributaries to the Eel River. The slopes are underlain by Upper Cretaceous to Tertiary age Coastal Belt of the Franciscan Complex (Durham, 1979) that is

described as gray-green consolidated sandstone containing scattered interbeds of siltstone, shale, and conglomerate. Where observed bedrock generally consisted of gray brown to orange brown sandstone that appeared pervasively jointed. Site slopes were observed to be steep ranging from 60 to 80± percent where they toe into two unnamed and small (less than 10-acre) watercourses that flow to the headwaters of Lower Outlet Creek. Lineaments of the active Maacama fault zone are mapped about 3500 feet east of the site area (Pampeyan and others, 1981).

General Observations: (keyed to Figure 1).

Recent Road Construction. An approximately 670-foot long driveway constructed at a gradients that range from 15 to 25 percent gradient leads from an existing pad area at the bottom (east side) of the property to the top of the property along the western property margin (Figure 1). The driveway climbs an east facing slope making several switchback turns for a gain in elevation of about 150 feet. The road appears to be constructed using cut and fill grading techniques. Exposed cutbanks and fill slopes appeared fresh and the landowner indicated that he had conducted the grading about a month before the site visit. In general cuts and fills were observed to be on the order of about 5 feet. Taller cuts up to 11 feet in height were observed at some of the switchback turns. Organic debris (for example tree stumps, brush, and logs) was observed protruding out of the fill. In many places the organic debris was observed to be in positions that appeared to be supporting the fill materials. There were no observable indications that the fills had been founded, keyed into, or placed on firm soils or bedrock. At the surface the fills appear loose and uncompacted.

Specific Observations: (keyed to Figures 1, 2, and 3)

CGS-1 Much of the fills along the recently graded driveway are placed on 50 percent slopes that descend approximately 50 feet to a small (drainage area of less than 10-acre) tributary to Lower Outlet Creek that runs along the southern portion of the subject site. Because the fills do not appear to be properly placed (for example containing organic debris and apparently not keyed or compacted) there appears to be a moderate risk of sediment to the tributary should the fills become saturated and move downslope.

CGS -2. A drop inlet culvert that is covered by a metal grate drains the small tributary that trends though the southern portion of the site (described above) under Highway 101. The outlet of the culvert was not discovered during the site visit; however it appears that it likely drains onto a grass covered flat that is the drainage divide between Lower Outlet Creek and Ryan Creek. It appears that the flat area is capable of filtering sediment and thereby reducing the risk of significant sediment delivery to Lower Outlet Creek and/or Ryan Creek. Because the culvert is covered the condition of the inlet was not observed and a determination regarding the likelihood of culvert plugging could not be made.

CGS-3. The recently graded driveway ascends to the upper portions of the parcel. A pad area was not constructed at the top of the property at time of the site visit. What appears to be fills on the order of 3 to 5 feet thick were observed to be placed at the top of the property where the road terminates on 60 percent slopes. The slopes descend approximately 25 feet to an adjacent property north of the subject site. The slopes continue to descend on the adjacent property for about 100 feet to what appears to be a small (less than 10-acre drainage area) tributary to Lower Outlet Creek. The fill was observed to contain logs and organic debris and

display no indications they were founded, keyed into, or placed on firm soils or bedrock. The fills appear loose and uncompacted. If the fills become saturated and move in a downslope direction there appears to be a low to moderate risk of sediment moving onto the adjacent property. While a dwelling was observed on the adjacent property, it was not in a position to be directly impacted from the fills placed during the recent road construction. As such, potential impacts to public safety appear low.

CGS-4. Fills observed to be about 3 to 5 feet thick are stock piled on what appears to be an existing and apparently stable skid trail. The skid trail is situated on 65 percent slopes that descend approximately 70 feet to Highway 101. The fills do not appear to have been founded, keyed into, or placed on firm soils or bedrock. The fills appear loose and uncompacted. There appears to be a moderate risk of minor amounts of sediment moving onto the highway should the fills become saturated and move in a downslope direction. Because it appears that the shoulder of the highway might contain the minor amounts of fills that could move on the highway, it appears the potential impact to public safety is low.

General Recommendations:

- An erosion control plan should be developed by a California Certified Engineering Geologist (CEG) or a licensed Professional Engineer (PE) experienced in hillside grading. The erosion control plan should provide mitigation and design that de-waters and drains the recently constructed driveway. The erosion control plan should include a time frame that outlines completion of mitigations prior to commencement of the 2012 fall/winter rains. The erosion control plan should include but not be limited to recommendations included below under Specific Recommendations.
- The recommendations provided in this memo should be considered in addition to requirements and recommendations made by other agencies including the County of Mendocino Department of Planning and Building.

Specific Recommendations:

- CGS-1. Evaluate and mitigate the potential for sediment delivery to the small watercourse that runs through the southern portion of the site. This may necessitate removing and properly re-compacting existing fills.
- CGS-2. Evaluate the potential for culvert plugging and provide mitigations as needed. Cal Trans should be notified of potential impacts to the drop inlet culvert that runs under Highway 101.
- CGS-3. Evaluate the adequacy of grading techniques and the stability of on-site fills that could possibly fail and move onto the adjacent property north of the subject site. The erosion control plan should provide mitigations to stabilize such fills.
- CGS-4. Evaluate the adequacy of grading techniques and the stability of stock piled fills placed on an existing skid trail that could possibly fail and move onto Highway 101. The erosion control plan should provide mitigations to stabilize such fills. Cal Trans should be notified of the potential conditions.

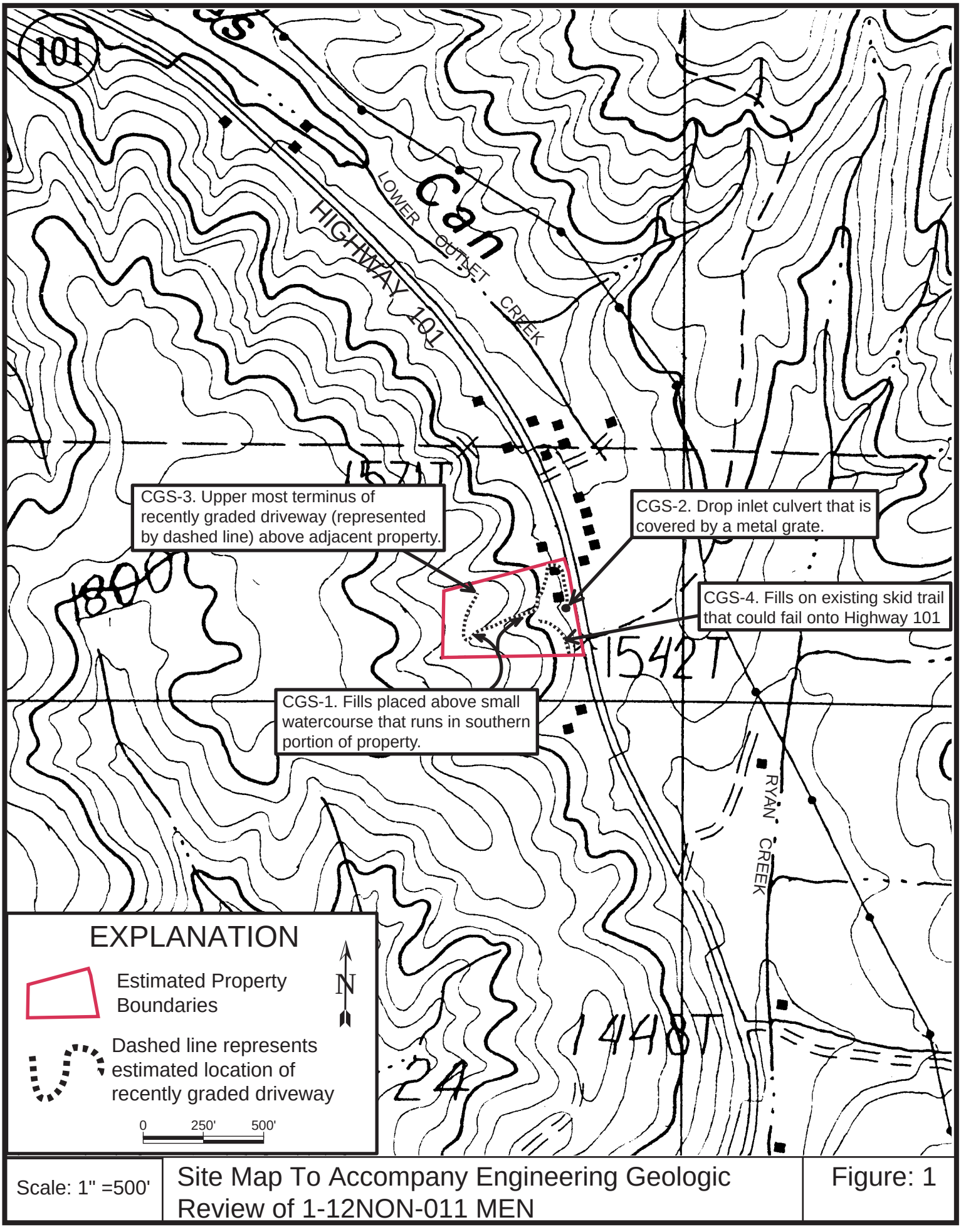
Disclosure: This memo has been provided to CALFIRE in order to assist them in determining the issues that should be addressed under their purview. It should in no way be considered an

Engineering Geologic Report and should not be substituted in any way for such evaluations and reports recommended and requested in this memo.

original signed by
David Longstreth, CEG # 2068
Certified Engineering Geologist

Concur
05/30/2012 *original signed by*
Date, Gerald J. Marshall, CEG # 1909
Senior Engineering Geologist

Attachments: Figures 1, 2, and 3.



Scale: 1" =500'	Site Map To Accompany Engineering Geologic Review of 1-12NON-011 MEN	Figure: 1

Map Point CGS-1.

Fills placed over small watercourse that trends through southern portion of subject site.

Map Point CGS-2.

Drop inlet culvert with metal grate.

	Photographs To Accompany Engineering Geologic Review of 1-12NON-011 MEN	Figure: 2

Map Point CGS-3.

Fills placed over slopes that descend to adjacent property north of subject site.

Map Point CGS-4.

Fills placed on skid trail that is located on slopes that descend to Highway 101.

	Photographs To Accompany Engineering Geologic Review of 1-12NON-011 MEN	Figure: 3

DEPARTMENT OF CONSERVATION

CALIFORNIA GEOLOGICAL SURVEY

801 K STREET • MS 13-40 • SACRAMENTO, CALIFORNIA 95814

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Memorandum

To: Jeanette Pedersen
California Department of Forestry
and Fire Protection
17501 N. Highway 101
Willits, CA 95490

From: David Longstreth
Department of Conservation
California Geological Survey
17501 N. Highway 101
Willits, CA 95490

Date: August 23, 2012

Subject: Engineering Geologic Assessment of Grading Operations at 70100 Arnett Drive, Leggett, CA; Cal Fire Case # 12CAMEU 005419-35.

References:

Davenport, C.W., 1983, Geology and Geomorphic Features Related to Landsliding, Noble Butte 7.5' Quadrangle, Mendocino County, California: California Division of Mines and Geology Open File Report 83-41 S.F., scale 1:24,000.

Aerial Photographs Reviewed:

CVN, 1952, Black and white aerial photographs, Roll 12K, Frames 171, 172; nominal scale 1:20,000.

Cartwright,1963, Black and white aerial photographs, Mendocino County Flight, Roll 9, Frames 49; 50; nominal scale 1:20,000

CDF ALL-UK,1981, Black and white aerial photographs, Mendocino County Flight, Roll 10, Frames 21, 22, nominal scale 1:20,000

WAC Inc., 1988, Black and white photographs, flight WAC CA 88, Roll 21, Frames 9, 10; nominal scale 1:31680.

WAC Inc., 2000, Black and white photographs, Flight WAC-00-CA, Roll 10, Frames 180, 181; nominal scale 1:31,680.

Introduction:

On August 16, 2012 the California Geological Survey (CGS) was requested by Jeanette Pedersen of CALFIRE to evaluate reported grading operations conducted at 70100 Arnett Drive, Leggett, CA. An August 21, 2012 site visit was attended by Chris Brown (AQMD), Jeanette Pedersen (CAL FIRE), Craig Pedersen (CAL FIRE), Craig Dudley (CAL FIRE), and Dave Longstreth (CGS).

Geologic Conditions:

The subject property consist of an approximately 120-acre parcel (70100 Arnett Drive, Leggett, California) located on steep slopes that drain to the Rock Creek and other unnamed tributaries to the Eel River. This review is limited to a roughly eight acre portion of the property located on relatively flat ground and will hence be referred to as the study area. The study area is underlain by Upper Cretaceous to Tertiary age Coastal Belt of the Franciscan Complex and locally mantled by Quaternary river terrace deposits (Davenport, 1983, Figure 1). The Coastal Belt Franciscan Complex is described as consisting of gray-green consolidated sandstone containing scattered interbeds of siltstone, shale, and conglomerate that is generally broken and sheared. Quaternary river terrace deposits locally overly the Franciscan Complex on elevated alluvial cut terrace platforms deposited during higher stands of the Eel River (Davenport, 1983). These deposits consist of orange brown silts and sands containing well-rounded pebbles and cobbles. Bedrock was not observed in the study area during the August 21, 2012 site visit.

An approximately 12-acre watercourse is located adjacent to and north of the study area that flows to a lower elevation alluvial cut terrace within a portion of the Standish Hickey State Recreational Area where a caretaker's house and a few outbuildings are located. The watercourse appears to disperse on the flat lower terrace and no channel was observed connecting to the Eel River. Davenport (1983) does not map any geomorphic landslide features in the study area, nor were any observed during the site visit.

Observations: (keyed to Figure 1)

Cleared Area. An approximately 4-acre area of the study area appears to have been cleared of vegetation (brush, conifer, and hardwoods) and bladed. Isolated piles of debris and soil were observed scattered along the margins of the cleared area (estimated limits shown on Figure 1). The apparent minor blading does not to appear to have adversely impacted large-scale slope stability in the study area. Some debris (on the order of 50 cubic yards) was observed to be placed above the 60 to 70 percent slopes that descend approximately 30 to 50 feet to a watercourse located north of the study area (shown on Figure 1). The debris appears loose and to contain organic debris. There appears to be a moderate risk of sediment delivery to the watercourse should portions of the debris become saturated and move in a down slope direction. It appears that sediment could flow onto the State Recreational Area but would likely come to rest on the relatively flat terrace. There appears to be a low likelihood of adverse impacts to existing buildings or improvements. Because the amount of potential sediment delivery to the watercourse appears relatively small and the watercourse appears to disperse on the lower terrace platform located in the State Recreational Area, the likelihood of adverse impacts to Highway 101 and/or sediment delivery to the Eel River similarly appears low.

Recommendations:

Cleared Area. The debris placed along the north side of the cleared area above the slopes that descend to the watercourse north of and below the cleared area should be removed such that the potential for the debris to delivery sediment to the watercourse is reduced. The debris should be placed and stabilized in a location where the threat of sediment delivery or adverse impacts to slope stability and/or down slope properties is minimized. A professional

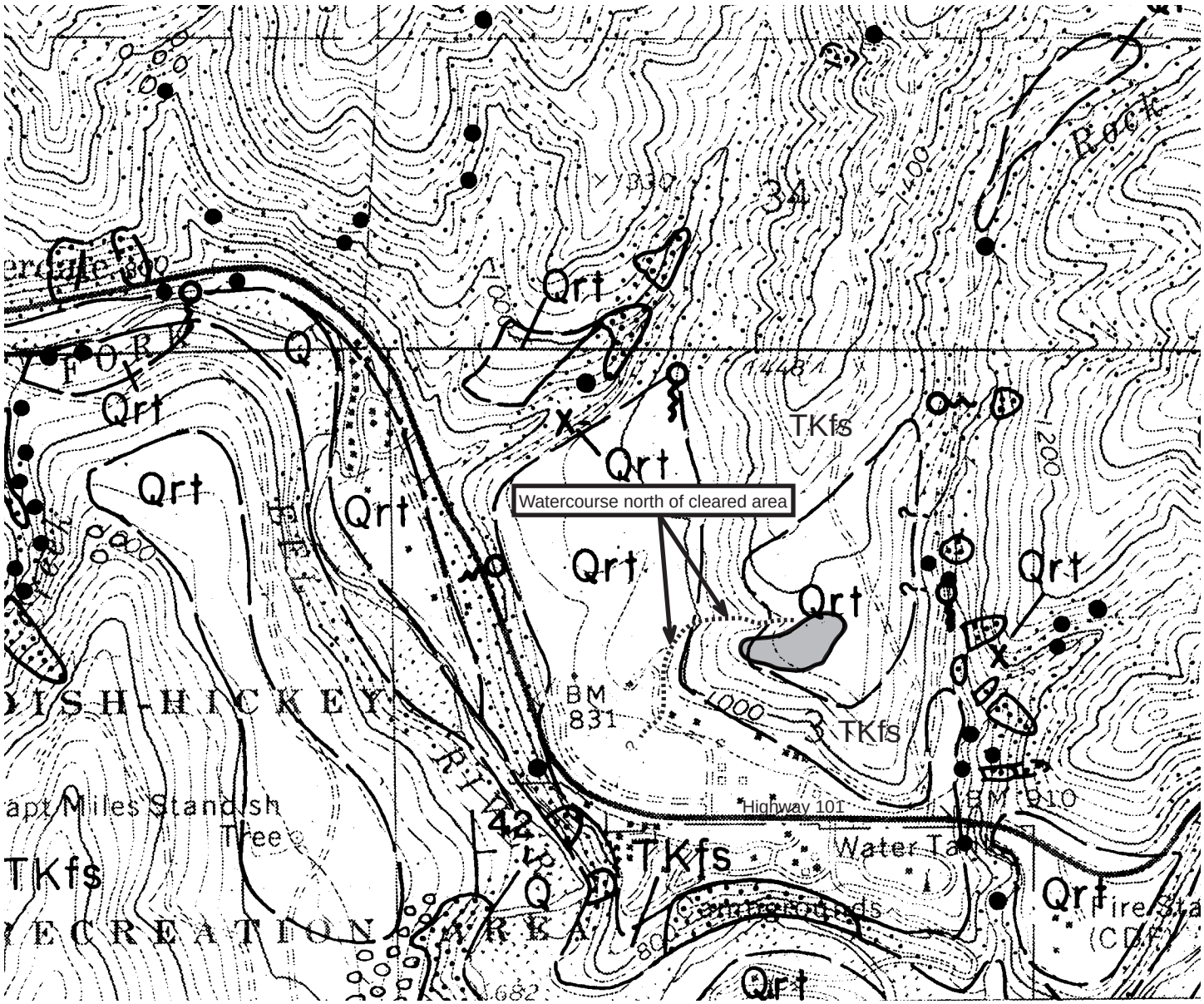
experienced in this type of work (for example a Registered Professional Forester, RPF or a Professional Geologist, PG) should be consulted to design and supervise the recommended work.

Disclosure: This memo has been provided to CALFIRE in order to assist them in determining the geologic issues that should be addressed under their purview. It should in no way be considered a Geologic Investigation and should not be substituted in any way for such evaluations and reports. The recommendations provided in this memo should be considered in addition to requirements and recommendations made by other agencies.

original signed by
David Longstreth, CEG # 2068
Certified Engineering Geologist

Concur
08/23/2012 *original signed by*
Date, Gerald J. Marshall, CEG # 1909
Senior Engineering Geologist

Attachments: Figure 1.



Explanation

Q	Alluvium
Qrt	River Terrace Deposits
TKfs	Franciscan Formation, coastal belt

N

0 500' 1000'

- Geologic contact, dashed where approximately located
- Rotational/Translational Landslide
- Earthflow
- Debris Slide
- Debris Flow/Torrent Track
- Debris Slide Amphitheater/ Slope
- Inner gorge
- Active Landslide (too small to show at map scale)
- Disrupted ground
- Slopes >70 percent
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- Shaded area represents estimated limits of cleared area.

Base Map: Modified from Davenport, C.W., 1983, Geology and Geomorphic Features Related to Landsliding, Noble Butte 7.5' Quadrangle, Mendocino County, California: California Division of Mines and Geology Open File Report 83-41 S.F., scale 1:24,000.

Date: Aug 2012 Scale: 1" =1000'	Regional Geologic Map To Accompany Engineering Geologic Review of Case Number 12CAMEU 005419-35	Figure: 1

DEPARTMENT OF FORESTRY AND FIRE PROTECTION
P.O. Box 944246
SACRAMENTO, CA 94244-2460
(916) 217-8647
Website: www.fire.ca.gov

August 31, 2023

Department of Cannabis Control
c/o Angela McIntire-Abbott
2920 Kilgore Road
Rancho Cordova, CA 95670

RE: Notice of Preparation for the Department of Cannabis Control Draft Environmental Impact Report for Licensing of Commercial Cannabis Cultivation in Mendocino County.

Dear Ms. McIntire-Abbott:

The California Department of Forestry and Fire Protection (CAL FIRE) appreciates the opportunity to comment on the Notice of Preparation for the Department of Cannabis Control (DCC) Draft Environmental Impact Report (DEIR) to support licensing of commercial cannabis cultivation in Mendocino County. CAL FIRE is tasked with providing fire protection and fire prevention services and enforcing the State's forest and fire laws, including without limitation the Z'berg-Nejedly Forest Practice Act. (Pub. Resources Code § 714.) In addition, the Office of State Fire Marshal, a program within CAL FIRE, is responsible for adopting and enforcing building standards related to fire prevention and other standards as provided for in the Health and Safety Code. The following comments are submitted jointly on behalf of all CAL FIRE programs and reflect CAL FIRE's combined experience in fire protection, fire prevention, and resource management.

Concerns Related to Indoor Cultivation of Cannabis

Indoor cultivation of cannabis presents numerous challenges for fire prevention and protection. Indoor cultivation using artificial light often requires electricity in excess of what the structure was originally intended to handle, leading to the potential for electrical fire. In a similar vein, faulty wiring or electrical equipment also have the potential to cause electrical fires. The production of cannabis extracts often involves chemicals and processes that pose a significant threat of explosion or ignition. These fires threaten human life and property and cause other potentially significant impacts to the human environment. More numerous fires tax the fire protection capabilities of CAL FIRE and other fire departments, which may lead to increased response times and/or costs of fire protection, a potentially significant impact per item XIV(a) of the CEQA Checklist. The DEIR should consider what mitigations are available to reduce the threat of fire or explosion at indoor cultivation operations. The licensing program could also include a requirement that all such indoor cultivation operations be in compliance with California's fire, electrical, and building regulations.

Concerns Related to the Outdoor Cultivation of Cannabis

Outdoor cultivation of cannabis presents further challenges to CAL FIRE's fire prevention and protection missions, as well as for its enforcement of the Forest Practice Act. Fire prevention and protection concerns include:

1. Over 90% of all wildfires occurring within CAL FIRE's jurisdiction are caused by humans, and the presence of humans greatly increases the risk of wildfire. Many outdoor grow operations occur in wildlands that are otherwise sparsely populated, and the increase in human activity increases the risk of wildfire. The DEIR should consider the potentially significant impacts arising from increased potential for wildfires, which threaten life and property, habitat for animals, water and air quality, and other significant environmental values, and should analyze mitigations to those impacts, including restrictions on siting and increased fire prevention measures for cultivation sites.

2. Whereas unpopulated timberland or other lands present a relatively low occurrence for fire protection, cannabis cultivation introduces people, structures, and valuable property into these lands, leading to increased need for fire protection from CAL FIRE and other agencies. The DEIR should consider the impacts to fire protection services from outdoor cultivation and propose mitigations for such impacts pursuant to item VIII(h) of the CEQA Checklist.

3. Outdoor cultivation is often conducted on land that was principally used for timber harvesting and is serviced only by roads intended for logging. These roads often do not meet the standards of inhabited areas for ingress for firefighting apparatus and egress for evacuating civilians. The DEIR should consider these potential impacts and mitigations, including requiring that all outdoor cultivation sites be serviced by roads meeting the ingress and egress standards for residential dwellings, regardless of whether a residential dwelling is present on the property.

4. Outdoor cultivation sites often have travel trailers and other non-permanent structures that are not required to maintain defensible space in accordance with the regulations adopted by the State Board of Forestry and Fire Protection pursuant to section 4290 of the Public Resources Code and the requirements imposed by the Legislature in section 4291. However, these trailers have similar potential for the ignition of fires as other structures. Without defensible space, a fire originating in a travel trailer or other non-permanent structure has a greater potential to spread to the wildlands surrounding the structure. DCC should consider requiring defensible space around outdoor cultivation sites and related structures that would otherwise not be subject to those requirements but present similar ignition potential.

5. Outdoor cultivation often involves the use of generators, pumps, and other gasoline operated equipment subject to the fire prevention requirements in section 4427 of the Public Resources Code, including that the ground be cleared of flammable vegetation around the equipment and that fire suppression tools be maintained near the equipment to allow personnel to suppress fires in their incipient phase.

6. Outdoor cultivation requires significant amounts of water, generally during a cannabis growing season that largely coincides with fire season. Over-drafting of water from watercourses could potentially limit water availability for fire suppression.

CAL FIRE's concerns regarding outdoor cultivation's impacts to timberland resources regulated by CAL FIRE pursuant to the Forest Practice Act include:

1. The conversion of timberland, as defined in section 4526 of the Public Resources Code, to a use other than growing timber requires a timberland conversion permit (or its equivalent) to be approved by CAL FIRE prior to conversion. (Pub. Resources Code § 4621.) However, CAL FIRE has observed that many outdoor cultivation sites were the result of unlawful and unpermitted conversion of timberlands. This failure to secure the required permits (and undergo their associated CEQA review) not only undermines CAL FIRE's protection of timber resources but also the ability of other agencies to protect resources for which they are the trustee (e.g., tribal representatives as to archaeological resources, the California Department of Fish and Wildlife as to fish and wildlife, the North Coast Regional Water Quality Control Board and State Water Resources Control Board as to water quality and allocation, etc.). The illegal conversion of timberland for cannabis cultivation has had immeasurable negative impacts to California's environment and Mendocino County in particular. The DEIR should analyze the potential significance of conversion of forestland to non-forest use per item II(d) of the CEQA Checklist, including environmental impacts of illegally converted cultivation sites, and consider mitigations including without limitation requiring that all cultivation sites located on timberlands demonstrate compliance with the Forest Practice Act.

2. Again, outdoor cultivation sites are often located on lands that have historically been used for timber harvesting and that are serviced only by logging roads that are intended and engineered only for limited, intermittent use. Outdoor cannabis cultivation often involves trucking in water and other supplies, increased motor traffic from workers and visitors, and other uses that tax logging roads not intended for that use. In addition, while the Forest Practice Act and Rules limit use of roads during wet conditions, there are no such restrictions on other uses of those roads during wet conditions. This expanded use and use during wet conditions often damages or destroys the road's erosion and sediment control facilities designed to limit water quality impacts during rain events, potentially increasing sediment delivery from the roads to watercourses. The DEIR should consider this potentially significant impact and analyze mitigations including standards for the construction and maintenance of roads servicing outdoor cultivation sites.

3. The conversion of timberlands to other uses often results in conflicts with timber harvesting on the neighboring timberlands, including but not limited to noise complaints, traffic, road maintenance disputes, aesthetics concerns, trespass, etc. These land use conflicts may represent a significant impact under item II(c) of the CEQA Checklist.

4. Growing trees are a valuable carbon sink that sequester carbon and thereby reduce atmospheric carbon that causes global climate change. The conversion of timberlands to cannabis cultivation removes those trees' ability to sequester carbon while resulting in an increase in atmospheric carbon due to the decay or open burning of the removed trees

and the cannabis vegetation that has no value (i.e., plants stems, leaves, root systems, and male cannabis plants). Additionally, the conversion of timberland to cannabis cultivation results in increased emissions from equipment and vehicular traffic related to the cultivation. Given this disparity between the carbon sequestering timber uses and the carbon intensive cannabis cultivation, the DEIR should consider the greenhouse gas impacts related to outdoor cannabis cultivation on timberland.

CAL FIRE appreciates the opportunity to comment on the Notice of Preparation for the Department of Cannabis Control Draft Environmental Impact Report for Licensing of Commercial Cannabis Cultivation in Mendocino County. As development of the draft document proceeds, please consider CAL FIRE a resource for forest and fire-related questions and concerns. I can be reached by phone at 916-217-8647 or by email to eric.huff@fire.ca.gov should you have questions or concerns about this correspondence.

Sincerely,

DocuSigned by:
Eric Huff
7200ED9A9ECC40A...

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Assistant Deputy Director
Forest Practice

Cc. Edith Hannigan, Executive Officer, California Board of Forestry and Fire Protection
J. Keith Gilless, Chair, California Board of Forestry and Fire Protection

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***GAVIN NEWSOM**., Governor*
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August 31, 2023

Angela McIntire-Abbott
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SUBJECT: NOTICE OF PREPARATION OF A DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE LICENSING OF COMMERCIAL CANNABIS CULTIVATION IN MENDOCINO COUNTY

Dear Angela McIntire-Abbott:

The California Department of Fish and Wildlife (Department) has reviewed the Notice of Preparation (NOP) of a Draft Environmental Impact Report (DEIR) for the Licensing of Commercial Cannabis Cultivation in Mendocino County (Project; State Clearinghouse Number 2023080049). The NOP was prepared pursuant to the California Environmental Quality Act (CEQA). The Department received the NOP from the Department of Cannabis Control (DCC) on August 2, 2023.

The Department has jurisdiction over the conservation, protection and management of fish, wildlife, native plants and their habitat. The Department is California's Trustee Agency for fish and wildlife resources and holds those resources in trust by statute for all the people of the State. (Fish and Game Code, §§ 711.7, subd. (a) & 1802; Pub. Resources Code, § 21070; CEQA Guidelines § 15386, subd. (a).) The Department, in its trustee capacity, has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species. (Id., § 1802.) Similarly, for purposes of CEQA, the Department is charged by law to provide, as available, biological expertise during public agency environmental review efforts, focusing specifically on projects and related activities that have the potential to adversely affect fish and wildlife resources.

The Department is also submitting comments as a Responsible Agency under CEQA. (Pub. Resources Code, § 21069; CEQA Guidelines, § 15381.) The Department expects that it may need to exercise regulatory authority as provided by the Fish and Game Code. As proposed, for example, the Project may be subject to the Department's lake and streambed alteration regulatory authority. (Fish and Game Code, § 1600 et seq.) Likewise, to the extent implementation of the Project as proposed may result in "take" as defined by State law of any species protected under the California Endangered Species Act (CESA) (Fish and Game Code, § 2050 et seq.), the project proponent may seek related take authorization as provided by the Fish and Game Code.

Thank you for the opportunity to provide comments and recommendations regarding those activities involved in the Project that may affect California fish and wildlife. Likewise, we appreciate the opportunity to provide comments regarding those aspects of the Project the Department, by law, may be required to carry out or approve through the exercise of its own regulatory authority under Fish and Game Code.

The Department continues to support efforts to effectively regulate cannabis cultivation, and to address its numerous and substantial environmental impacts. The Department believes that greater regulatory oversight and enforcement by Lead Agencies, including Mendocino County, can help minimize the environmental impacts of cannabis cultivation.

Environmental Baseline

As outlined in CEQA section 15002(a), one basic purpose of CEQA is to inform governmental decision makers and the public about the potential, significant environmental effects of *proposed* activities. Unlike a typical CEQA review process, preparation and review of the DEIR for licensing of cannabis cultivation in Mendocino County will primarily address environmental impacts "after-the-fact."

Proposition 64 asked the State to create strict environmental regulations and ensure full compliance with environmental laws (section 2 (F)). In addition, each site must comply with CEQA and conduct environmental review of proposed projects. The County of Mendocino (County) adopted a Mitigated Negative Declaration under CEQA for its Cannabis Cultivation Regulations[1] (ordinance) in April 2017. Many cannabis cultivation sites that submitted an application pursuant to the 2017 regulation have been allowed to continue to operate prior to the issuance of a County permit.

The NOP states that DCC has issued approximately 608 provisional commercial cannabis cultivation licenses in Mendocino County. Most of these provisionally-licensed sites submitted an application for a local permit under the County's 2017 ordinance. Applications submitted under Phase 1 of the County's 2017 ordinance, which make up the majority of sites with provisional DCC licenses, were required to demonstrate that cannabis cultivation existed prior to January 1, 2016. The County's Mitigated Negative Declaration defined the baseline as August 26, 2016, the date on which the County submitted requests for early consultation to Responsible and Trustee agencies and other interested parties. The Department supports the use of an August 26, 2016 date for determining baseline conditions for the DEIR. This is the appropriate CEQA baseline for cannabis projects with cultivation that existed prior to adoption of the County ordinance, or with existing applications in the County's cannabis regulatory program, and environmental analysis in the DEIR should reflect this date. (**Recommendation #1**)

[1] Mendocino County Mitigated Negative Declaration and Mitigation Monitoring and Reporting Program for the Medical Cannabis Cultivation Regulation, adopted April 2017, State Clearinghouse number 2016112028.

In May 2023, Mendocino County adopted amendments to the ordinance, and adopted an addendum to the 2017 Mitigated Negative Declaration relating to the County's cannabis regulation and permitting processes. The NOP states the DEIR prepared by DCC will "programmatically evaluate the environmental impacts of the DCC's annual licensing of cannabis cultivation operations in the county as well as the environmental impacts of future licensed commercial cannabis operations." To ensure the public and other agencies have the opportunity to comment effectively on the Project, the DEIR should explain, in detail, how the County and DCC processes, licenses and permits will be implemented in relationship to each other, and how they will interact with other existing permits and processes. (**Recommendation #2**)

Cumulative Impacts

Cumulative impacts must be addressed pursuant to CEQA section 15130. The NOP states the DEIR will address the cumulative environmental consequences of the proposed Project in combination with other closely related past, present, and reasonably foreseeable future projects in the area.

CEQA section 15355 defines cumulative impacts as "two or more individual effects which, when considered together, are considerable…" and may include "the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects." This section continues, "Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time."

The Department is concerned about cumulative impacts not only as they relate to licensed cannabis cultivation and associated development, but also unpermitted cannabis cultivation, and cannabis cultivation sites that have been abandoned without remediation. For example, Mendocino County has denied a number of local permit applications. Many cannabis cultivation properties in the permitting process were allowed to continue operations for years prior to permit denial. The DEIR should address unpermitted cultivation and abandoned sites, as well as cannabis cultivation sites that will ultimately receive an annual license with DCC.

Department staff have observed that cannabis cultivation properties in the County permitting process have often expanded development after the baseline date, but prior to review and permit issuance. This expansion of development includes measurable impacts which have not yet been analyzed. These impacts include tree removal, grading, development of infrastructure (e.g. roads and hoop houses), additional water diversion infrastructure (including surface diversions and groundwater wells), and other development related to expansion of cultivation and/or residential development on parcels with cannabis cultivation. Impacts from these past and present projects can be observed and measured using existing resources, and should be documented, quantified, analyzed and disclosed in the DEIR.

The Department recommends the DEIR consider all cannabis cultivation sites when determining cumulative impacts of its licensing program in Mendocino County, including quantifying impacts that have occurred since the environmental baseline date. (**Recommendation #3**)

Environmental Impacts

Documented environmental impacts of cannabis cultivation include habitat fragmentation, habitat loss through land clearing and conversion, reduction in instream flow, and delivery of sediment, nutrients, petroleum products, and pesticides to streams (Carah et al. 2015). Increased development in rural or previously undeveloped areas are a major concern to the Department and include road building, grading, pond construction, stream crossing construction, increased use of poorly maintained road systems, and hydrologic modification including rerouting of streams and interception of groundwater through poorly constructed road systems.

Wetlands may be directly impacted and permanently lost through development and conversion, and can be directly or indirectly impacted by hydrologic modification (CDFW 2014). State policy (Executive Order W-59-93) and Mendocino County policy (General Plan Resource Management Element Policy RM-29) each seek to achieve no net loss of wetlands. The DEIR should include measures to avoid or fully mitigate impacts to wetlands. (**Recommendation #4**)

Additional impacts Department staff have documented include degraded water quality, degraded habitat due to inappropriate location of development, development within riparian buffers, loss and degradation of wetland habitat, wildlife entanglement and mortality due to cultivation site hazards (e.g., plastic mesh), wildlife entrapment, fish passage barriers due to improperly designed water diversions and stream crossings, altered natural photoperiods from light pollution, and introduction of non-native species (fish and plants) resulting in predation of native species and degraded habitat quality.

Many of these impacts are unique to cannabis cultivation. Strategies to minimize and mitigate potentially significant environmental impacts should be fully considered and incorporated in the DEIR. These environmental impacts should be analyzed both individually and on a cumulative basis on a parcel, stream, watershed, and regional scale. (**Recommendation #5**)

<u>Water Use and Availability</u>

California has a Mediterranean climate, where most of the state's precipitation falls from October to May (CDFG 2003), not during the primary cannabis summer growing season. Due to the lack of summer rainfall and the absence of snow, rivers and streams have receding flow from May until September. Water use peaks in the heat of the

summer at the same time instream flow is at its lowest, creating a conflict between water demand and water availability for fish and wildlife resources. The Department is concerned there is not adequate flow in most streams to meet the water demand for cannabis cultivation at its current levels, as well as the domestic water use for dwellings and other residential and commercial uses associated with or developed to facilitate cannabis cultivation and processing. Based on numerous field observations and ongoing research, the Department believes the overuse of surface water diversions for cannabis cultivation has and will continue to have a significant impact on aquatic resources.

The potentially significant impacts from the substantial alteration, and diversion and use of water from streams and rivers must be disclosed and analyzed in the DEIR. These environmental impacts should be analyzed both individually and on a cumulative basis on a parcel, stream, watershed, and regional scale. (**Recommendation #6**)

In addition, the Department has observed the construction and use of large ponds as a water storage method has increased in the County. In many cases, Mendocino County has allowed the construction of new ponds, which often involve substantial grading and fill, under a ministerial grading and/or pond exemption permit with no environmental review. These ponds may pose risks to water quality and sensitive habitats if they are designed and constructed without proper engineering. The Department has observed ponds built in inappropriate locations, and failed ponds that have delivered sediment to nearby streams. In addition, these ponds often provide breeding habitat for non-native, invasive species such as American bullfrog (*Lithobates catesbianus*), a species that preys upon native frogs such as the northern red-legged frog (*Rana aurora)* and foothill yellow-legged frog (*Rana boylii*), both California Species of Special Concern. The DEIR should provide a mechanism to regulate the development of ponds as part of cannabis cultivation permitting, including a requirement for engineered designs where appropriate, and invasive species management plans for all ponds. Ponds may be subject to the notification requirement in Fish and Game Code section 1602 et seq. if they are filled from, or outlet to, a stream or wetland.
(**Recommendation #7**)

Major watersheds, such as the Eel River, Mattole River, and Russian River watersheds, overlap with adjacent counties. Potential and existing impacts to those watersheds are not contained by county lines. Impacts should, therefore, be assessed at the watershed level, and should not be limited to impacts contained within County boundaries. The Department recommends the scope of the DEIR include impacts to these watersheds from cannabis cultivation located in Mendocino County. (**Recommendation #8**).

<u>Direct impacts to streams, riparian areas, wetlands</u>

Many areas where cannabis cultivation may be permitted include agricultural and other areas within the 100-year floodplain. Floodplains are an important physical and

biological component of riverine ecosystems. All rivers flood, and flooding is an expected and recurring event in natural river systems. Development in flood-prone areas disconnects rivers from their natural floodplains and displaces, fragments, and degrades important riparian habitat. Development in floodplains often eliminates benefits of natural flooding regimes such as deposition of river silt on valley floor soils and recharging of wetlands. In addition, braided channel structure, off-channel fish habitat, and backwaters are eliminated, resulting in higher velocity flows. These changes lower habitat suitability for salmonids, which need low-flow refugia to escape flood flows. Structures in flood plains are vulnerable to erosion and flood damage. Once structures are built and threatened by river flooding, property owners often seek to armor river banks or build or raise levees to prevent future property damage. Thus, not only does development displace riparian and floodplain habitat when it is built, it often results in further habitat and floodplain loss through additional development to protect structures.

Development and habitat conversion in floodplains results in degradation of riverine and riparian habitats, and negatively impacts the fish and wildlife species that depend on them. The Department recommends that placement of new permanent structures for cannabis cultivation within the 100-year floodplain of any stream or river is prohibited. (**Recommendation #9**)

Impacts of Night Lighting on Wildlife

Cannabis cultivation often includes the use of artificial lighting in hoophouses, and so-called “mixed-light” techniques to increase yields. The adverse ecological effects of artificial night lighting on terrestrial, aquatic, and marine resources such as fish, birds, mammals, and plants are well documented (Johnson and Klemens 2005, Longcore and Rich 2016, Rich and Longcore 2006). Some of these effects include altered migration patterns and reproductive and development rates, changes in singing behavior in bird species (Miller 2006), changes in foraging behavior and predator-prey interactions, altered natural community assemblages, phototaxis (attraction and movement towards light), disorientation, entrapment, and temporary blindness (Longcore and Rich 2004, Longcore and Rich 2016).

The Department has determined that light pollution disrupts the abilities of night-foraging birds (CDFG 2007). Artificial lighting impacts bat roosts, and Johnston et al. (2004) recommend that artificial lighting be directed away from bat roosts or possibly shaded by trees. Research on the effects of artificial lighting on salmonid populations indicate that increased light intensity appears to slow or stop out-migrating juvenile salmon and affects feeding patterns. Juvenile salmonids in the presence of increased artificial night lighting may be more vulnerable to predation (McDonald 1960, Patten 1971, Ginetz and Larkin 1976, Tabor et al. 2004). Because cannabis cultivation sites are commonly located in remote forested areas that would otherwise not be affected by night light pollution, and because these forested areas contain habitat for many

organisms that are negatively impacted by light pollution, cultivation using artificial light on a landscape scale could have a significant impact on wildlife.

The Department recommends that if lighting is used for cultivation within structures, light should not be visible from outside the structure. DCC should ensure this condition is enforceable, and actively monitored for compliance. The use of automatic greenhouse covers should be mandated or encouraged to reduce the incidence of light pollution (**Recommendation #10**).

Impacts of Noise on Wildlife

Diesel and gasoline-powered electric generators are a common fixture of indoor and outdoor cannabis cultivation sites. Electric generators can produce considerable air and noise pollution. The effects of noise pollution on wildlife include disrupting communication between individuals, affecting predator-prey relationships and foraging efficiency, and habitat selection and bird nesting density (Barber et al. 2009; Francis and Barber 2013).

On a watershed scale, the chronic noise pollution from numerous cannabis cultivation site generators has the potential to result in substantial habitat loss or degradation to a number of wildlife species. Generator-produced noise pollution can be especially harmful to night-foraging animals such as owls and bats, which hunt for prey primarily though hearing. The State- and federally-threatened northern spotted owl (*Strix occidentalis*), for instance, occurs in forested coastal Mendocino County and is vulnerable to nighttime generator noise impacts.

Impacts to bats from noise are another specific concern. Populations of many bat species across North America and globally are declining. Approximately fifteen percent of the global bat fauna are listed as threatened by the International Union for Conservation of Nature (IUCN). However, a greater number of species (about 18%) are listed by the IUCN as “data deficient,” meaning there is a lack of studies that can be used to support assessments of conservation status (Voigt and Kingston 2016). This decline has numerous causes, but habitat loss and degradation are principal contributors. Bats have been shown to avoid areas with chronic noise (Schaub et al. 2008) and the foraging success of certain bat species is reduced by chronic noise (Siemers and Schuab 2011).

In conjunction with the other habitat fragmentation, degradation, and disturbance-related impacts of outdoor cannabis cultivation already mentioned, both night light pollution and chronic generator-induced noise impacts may contribute to landscape-scale wildlife habitat declines and may have individual and cumulative significant impacts.

Based upon the information above, the Department recommends the DEIR include an analysis of potential night light pollution and chronic noise exposure impacts to wildlife, and effective avoidance, minimization and/or mitigation strategies. (**Recommendation #11**)

Impacts to Listed Species

Mendocino County is known to support several species listed or candidate under the California Endangered Species Act (CESA, Fish and Game Code section 2050 et seq.). Specifically, Coho Salmon (*Oncorhynchus kisutch*), Summer Steelhead (*O. Mykiss),* and Northern Spotted Owl (*Strix occidentalis caurina*) are present in areas where cannabis cultivation occurs. Cannabis cultivation activities detailed above have the potential to cause "take" of and impacts to these listed species. Take of species of plants or animals listed as endangered or threatened under the California Endangered Species Act (CESA) is unlawful unless authorized by the Department with an Incidental Take Permit. The DEIR should state whether the Project could result in any incidental take of any CESA-listed species. DCC should adequately analyze potential impacts and include avoidance, minimization and mitigation measures to avoid or mitigate impacts in the DEIR. (**Recommendation #12**) For Coho Salmon and Summer Steelhead, cumulative impacts from surface water diversion are a particular concern.

General Comments

Effectiveness of Mitigation Measures

Mendocino County's Cannabis Regulations have been in effect since April 2017. The Department is concerned the County's existing regulatory framework has not been effective in avoiding, minimizing and/or mitigating the environmental impacts of cannabis cultivation. Pursuant to CEQA section 15002, the DEIR must disclose and evaluate all of the project's potentially significant impacts; identify ways to avoid or significantly reduce environmental damage; propose, as appropriate, feasible and effective mitigations for those impacts; and disclose reasons for approving the proposed project if significant environmental impacts will occur. In addition, pursuant to CEQA section 15126.4(a)(2), mitigation measures must be fully enforceable through permit conditions, agreements, or other legally binding instruments.

The DEIR should include an analysis of the effectiveness of mitigation measures under the current program in avoiding, minimizing or reducing the environmental impacts of cannabis cultivation sites, particularly if the same or similar mitigation measures are proposed for use in the DCC's licensing program **(Recommendation #13)**.

Fish and Game Code

Several Fish and Game Code sections apply to activities associated with cannabis cultivation. Fish and Game Code section 1602 et seq. requires notification for diversions of water from a surface water source, or of water hydrologically connected to a surface water source (e.g. offset wells), as well as for physical changes to the bed, channel or bank of any river, stream, or lake. State licensing through DCC requires that all cultivators obtain either a Lake or Streambed Alteration Agreement (LSAA) pursuant to FGC section 1602, or verification from the Department stating that an LSAA is not required.

Department staff have documented increased observations of unpermitted non-native aquatic species introductions to ponds used for water storage and water diversion associated with cannabis cultivation. Fish and Game Code section 6400 requires first submitting for inspection and securing a stocking permit from the Department before planting fish. The Department recommends the Project prohibit the introduction of non-native species to ponds, and DCC should address the potential environmental impacts from existing non-native species in the DEIR. (**Recommendation #14)**

DCC staff and/or license applicants should consult with the Department to ensure compliance with all FGC sections. Examples of other applicable FGC sections include but are not limited to section 2050 et seq. CESA section 5650 (prohibits water pollution), section 5652 (prohibits refuse disposal in or near streams), and section 5937 (requires sufficient water bypass and fish passage, relating to dams).

Summary of Recommendations

In summary, the Department provides the following recommendations:

1. The Department supports the use of an August 26, 2016 date for determining baseline conditions for the DEIR. This is the appropriate CEQA baseline for cannabis projects with cultivation that existed prior to adoption of the County ordinance, or with existing applications in the County's cannabis regulatory program, and environmental analysis in the DEIR should reflect this date.

2. To ensure the public and other agencies have the opportunity to comment effectively on the Project, the DEIR should explain, in detail, how the County and DCC processes, licenses and permits will be implemented in relationship to each other, and how they will interact with other existing permits and processes..

3. The Department recommends the DEIR consider all cannabis cultivation sites when determining cumulative impacts of its licensing program in Mendocino

County, including quantifying impacts that have occurred since the environmental baseline date.

4. The DEIR should include measures to avoid or fully mitigate impacts to wetlands.

5. Strategies to minimize and mitigate potentially significant environmental impacts should be fully considered and incorporated in the DEIR. These environmental impacts should be analyzed both individually and on a cumulative basis on a parcel, stream, watershed, and regional scale

6. The potentially significant impacts from the substantial alteration, and diversion and use of water from streams and rivers must be disclosed and analyzed in the DEIR. These environmental impacts should be analyzed both individually and on a cumulative basis on a parcel, stream, watershed, and regional scale.

7. The DEIR should provide a mechanism to regulate the development of ponds as part of cannabis cultivation permitting, including a requirement for engineered designs where appropriate, and invasive species management plans for all ponds. Ponds may be subject to the notification requirement in Fish and Game Code section 1602 et seq. if they are filled from, or outlet to a stream or wetland.

8. The Department recommends the scope of the DEIR include impacts to these watersheds from cannabis cultivation located in Mendocino County.

9. The Department recommends that placement of new permanent structures for cannabis cultivation within the 100-year floodplain of any stream or river is prohibited.

10. The Department recommends that if lighting is used for cultivation within structures, light should not be visible from outside the structure. DCC should ensure this condition is enforceable, and actively monitored for compliance. The use of automatic greenhouse covers should be mandated or encouraged to reduce the incidence of light pollution

11. The Department recommends the DEIR include an analysis of potential night light pollution and chronic noise exposure impacts to wildlife, and effective avoidance, minimization and/or mitigation strategies.

12. The DEIR should state whether the Project could result in incidental take of any CESA-listed species. DCC should adequately analyze potential impacts and include avoidance, minimization and mitigation measures to avoid take and mitigate all direct and indirect impacts in the DEIR.

13. The DEIR should include an analysis of the effectiveness of mitigation measures under the current program in avoiding, minimizing or reducing the environmental impacts of cannabis cultivation sites, particularly if the same or similar mitigation measures are proposed for use in the DCC's licensing program.

14. The Department recommends the Project prohibit the introduction of non-native species to ponds, and DCC should address the potential environmental impacts from existing non-native species in the DEIR.

We appreciate the opportunity to comment on the Project and look forward to working with the DCC to support the regulation of commercial cannabis cultivation while protecting the fish and wildlife resources held in trust for all Californians. The Department is available for consultation during all stages of the CEQA process, to share information related to fish and wildlife resources, and discuss potential impacts and proposed mitigation. If you have any questions or would like to request a meeting please contact Senior Environmental Scientist (Supervisor) Angela Liebenberg at cegareferrals@wildlife.ca.gov.

Sincerely,

DocuSigned by:
Rebecca Garwood
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Rebecca Garwood
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From: laura@martyjuana.com
Sent: Thursday, August 31, 2023 9:45 AM
To: Public Comment@Cannabis
Cc: Marty Clein; hashchakj@mendocinocounty.org; Michael Katz
Subject: Mendocino County CEQA EIR scoping public Comments

Follow Up Flag: Follow up
Flag Status: Flagged

[EXTERNAL]: laura@martyjuana.com

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8/31/2023

Dear DCC, Ascent, and all interested parties,

As Mendocino County farmers who have had an approved County cannabis cultivation permit (not an embossed receipt) since 2017, including being inspected again and renewed recently. As well as having had a State Provisional license since they became available in 2018. We feel compelled to comment on the scoping process for the new pathway to CEQA compliance.

We read the notice of preparation and we understand the focus as it was stated for the scoping process, ""The EIR will programmatically evaluate the environmental impacts of the DCC's annual licensing of commercial cannabis cultivation operations in the county as well as the environmental impacts of future licensed commercial cannabis cultivation operations."

We listened to the State scoping meeting and we have read the letter to the Mendocino BOS from Director Nicole Elliot of the DCC regarding the CEQA process. We appreciate the State stepping into partnership with our County geared at transitioning the Phase One cohort from Provisional to Annual licenses.

The money being spent on this EIR came from the State's LJAGP grant awarded to our County. The scope of that LJAGP was to assist with transitioning existing cultivators to State annual licenses. We feel strongly that should still be the main focus.

We are not land use experts, although we have sure learned a whole lot over the past 7+ years of working thorough the dual County and State regulatory framework. Our 10,000 sq foot cultivation is located in the hills of Covelo, Round Valley which is zoned as Rangeland. We have been part of the group who has been pushing the County for an EIR all along. And we are glad to have one being prepared now to clarify the parameters for the public.

But we want to be sure that the scope of the State CEQA EIR delineates the difference between Phase One farms, who all had to prove prior cultivation to even qualify for Phase One. To repeat for emphasis, Phase One farms had to prove prior cultivation to even qualify for Phase One, is a very important point!

We understand that farms that are looking to expand, and especially new cultivation sites being considered in Phase Three, will likely have to do additional environmental reports to guarantee that they fall within the scope of the EIR. While we are not against limited expansion, we have no plans personally to expand.

We strongly believe Phase One farms should be exempt, or grandfathered in to CEQA approval via the EIR. These farms have already completed the required environmental assessments, have already been inspected by the various County and State agencies, and in many cases, are already approved, or in a queue with their documents ready and waiting to be approved.

Using multiple pathways for CEQA will insure the highest number of farms can achieve their State annual license. Finding a way to accept Ap G documents will help, the DCC process those in the program who have already completed the checklist,

Using the MND is imperative! It was written to cover upward of 10,000 small farms and we have less that 1000 small farms using approximately 200 acres of land right now in the Mendocino as part of Phase One of our ordinance. These numbers are notable, especially when cannabis cultivation is compared to other agricultural crops in our County, such as the 16,000+ acres of grape vines.

We heard at the scoping meeting, and as stated in the quote from the DCC above, the EIR will take into account all cannabis activities preset and future. We believe the proof of prior cultivation, and therefore, every single farm in the Phase One cohort, with an emphasis on those who have not expanded since the ordinance passed or who have done so with proper approvals, are covered under the prior MND.

As you know, 10,000 sq ft and under, is considered by the State as a small farm, and anything above it is classified as a medium or large farm in the California cannabis sector. Our farm, like many in Mendocino County, is also completely outdoor. We are 3rd party certified by SUN+EARTH, a non-profit organization out of Oregon, whose standards are like saying we are "beyond organic."

Mendocino County has a rich history of sustainable agriculture as a center of the back-to-the-land movement. We were the were the 1st County in the USA to vote for non-gmo standards regarding commercial crops. We are the environmentalists! Many, if not all of the Phase One farms that are active in the local cannabis program are longtime stewards of the land. These types of documented best management practices should also count toward exemptions from CEQA. The requirements have already been fulfilled.

We are members of and appreciate the Mendocino Cannabis Alliance (MCA) and urge you to take into account the valuable insights that the many professionals, stakeholders and advocates within this organization bring to the table.

Thank you for allowing public input and considering our comments.

Laura & Marty Clein
Martyjuana™
Mendocino County

August 30, 2023

Coleen Browder
P.O. Box 894 Hopland CA
coleenb@sonic.net 707-542-5211 call or text

DCC Legal Affairs Division
2920 Kilgore Road
Rancho Cordova, CA 95670
In care of: Charisse.Diaz@cannabis.ca.gov

RE Public Comment - Draft EIP Licensing of Commercial Cannabis Cultivation in Mendocino County Project

To whom it may concern:

BACKGROUND

I purchased my property, an undeveloped 130 acres in the hills west of Hopland, March 2014. I was the second purchaser of an approximate 3000 acre 16 parcel development. Only a few parcels per a year were sold. I believe all parcels were sold by 2018. Zoning is Agriculture / grazing rangeland, primarily an oak forest with madrone, manzanita, a few fir and very little brush. Terrain is steep to very steep with very little open useable space. I believe all these parcels were in the Williamson Act (sheep and cattle grazing?). I built my 3700 sf retirement home beginning in 2019. I am the only resident in the development. Until recently there were 11 cannabis properties and 5 others: 2 recreational; 2 Williamson Act grazing; and mine, residence with Williamson Act use.

Parcel access is by crossing two private road easements at the end of county Feliz Creek Road then by a 5 mile long dead end private road belonging to the 16 parcels; all behind a locked gate. The road was very good from 2014 through the fall of 2018. Per our Mendocino County 2013 Recorded Road Agreement, which all parcel purchasers received in the property disclosures, this road is described as "approximately 15' wide, rough grade gravel". In 2014, CalFire required that turnouts be installed every 300' where there were blind curves. This work was completed in 2014.

All parcels except one is off-grid; otherwise, there is no electric or gas service here. Water is by private wells and/or trucked in.

This entire area was largely pristine and quiet/uneventful until 2018 then ramping up in 2019 and more so by early 2020.

My Opinions

1. Mendocino County should have never allowed cannabis activities here:
    a. Private gravel road not intended for such use
    b. Should businesses be intending to profit from the use of a private road?
    c. Cannabis businesses are not conducive to this area
2. These cannabis operations:
    a. obviously did not have a business plan
    b. and the vested property owners (not always the operator) did not read and understand the Recorded Road Agreement (in any case, however, the property owner is accountable to the terms of this agreement)

Starting in 2020 the troubles really began:

- Some cannabis properties where the private road passes through the property are required to make changes to the private road in order to receive their required cannabis permits. The cannabis folk feel all parcels should all pay for this work. This is wrong!
- Starting in the fall of 2020, at first slowly and unsuspecting, a hostile takeover of the Road Associations by the cannabis operators began. This was not obvious until Nov./Dec. 2021.
- In the spring of 2021, all but one cannabis parcel refused to pay for road damages (heavy use, many water trucks, etc) beyond "normal maintenance" as prescribed by the Recorded Road Agreement.
- This one operator noted above, did not pay for damages after all and since then has joined the hostile takeover of the Road Association.
- All were slow to almost no pay in the past for road maintenance
- Then the private road serving the 16 parcels was widened June 29 - July 7, 2023, to 20' – 30', perhaps even up to 40' and much of the gravel has been removed (this winter will show how much). Widening is an "improvement" and not allowed by the Recorded Road Agreement. This work was done without any notice whatsoever to me. Coincidentally this work started and ended the very same days I was out of the area in Sonoma County.
- And it looks like some cannabis permit work was done on the road at this time as well – adding costs to all parcels
- Furthermore, now the lack of gravel on the road is causing dust storms without even being driven on. This is constant. The wind is strong and blows nearly all the time. So many loads of soil blowing away! And this winter much more will wash away. Lack of maintenance since the hostile takeover already caused a lot of ruts and soil washouts during the storms of 2021/2022 and again 2022/2023!
- One cannabis operator (not a property owner) acquired an additional "partner" in the fall of 2020 and new additional properties. These properties are below this development and are the initial private road access easements. I was told in 2022, that the application of "Dust-Off" is now "mandatory" for these easements. Per our attorney (this issue was first addressed in 2017), Dust-Off is also an improvement and not allowed. Since there is no formal road agreement, California Civil Code Section 845, applies.

PROBABLE ENVIRONMENTAL EFFECTS

Busy businesses; **huge increase in vehicle and people traffic**; non-residents and employees. In contrast, I live here and only drive down and back once a week at the very most. And recreational property owners only come up once in a great while.

Aesthetics

- Private roads / dust / and destruction; non-resident seasonal and some full-time employees
- Green houses dot what was once pristine oak forest
- The smell of cannabis sickens me

Agriculture and Forestry Resources

- Zoned for, and more conducive for grazing / all parcels were in the Williamson Act; but no longer

Air Quality

- The smell of cannabis sickens me
- Huge amounts of dust released into the atmosphere due to increased traffic; where in the past, dust was nearly none pre-2019/2020; now everything on my property is covered in dust, inside and out. I have a good amount of packed rock on my driveway, so it's not my dust
- Now with gravel removed from the road, the constant wind here is creating very large dust storms
- Private gravel roads were not intended for this kind of abuse

Biological Resources

- Excessive water use, overstressed wells; then requires many water trucks to bring water; I was told in 2021/2022 that as many as 15 trucks/day were required just for one operation (exaggerated rumor? I don't know but I did see and hear a lot of trucks coming and going)

Energy

- All off-grid operations; requires generators running for grow lights and pumping water

Geology and Soils

- Huge soils loss from abuse of private roads

Greenhouse Gas Emissions

- All off-grid operations; requires generators running for: grow lights and pumping water; I am not aware of any solar installations for these operations but I do hear the generators running.
- Increased traffic cars, trucks, and rtv's both on and off road

Hazards and Hazardous Materials

- Increased traffic on narrow private roads
- Increased traffic on a narrow county paved road, too!

Hydrology and Water Quality

Over-pumping wells dry up neighboring wells
All run off from these 16 parcels go straight down to Feliz Creek to the north

Land Use and Planning

- Horrendous use of what was a pristine beautiful mountain / total lack of planning by both the county and cannabis businesses (same on the ridge across from me on McNab… pretty ugly.)

Noise

- Traffic and generators

Population and Housing

- Owners and employees do not reside here; i.e., only strangers and commuters come and go
- Employees, many who don't speak English get easily lost up here; one drove her car off road down my property and got stuck late at night
- How is it that these operations can have "temporary" housing for employees? Again this development is behind a locked gate and **supposed to be private with access only for property owners and guests**.

Public Services

- The county road coming in (narrow Feliz Creek Rd) is not built for this much traffic either and takes a beating

Transportation – see public services

Utilities and Service Systems / there are no services here and I don't need them

Wildfire

- With increased people, especially many who are not vested here brings increased potential for fire. This area looks long overdue for a control burn thus it is high risk for wild fires. There have been at least three fires in the area since about 2019… one across on the other ridge; one below me in the creek area; and one very near me up on the ridge.

Just a thought… could it be that this ruckus since 2020/2021, is about obtaining final permitting? A rush to finish their permits?

I don't think these businesses should be profiting or intending to profit from the excessive use of a private road.

Minimally this is bad manners. And finally this is really bad business.

Thank you for your time. Please feel free to call me if there are any questions.

Coleen Browder
707-542-5211

From: 4garynjudy@comcast.net
Sent: Thursday, August 31, 2023 9:25 PM
To: Public Comment@Cannabis
Cc: 4kirwin2@comcast.net
Subject: ENVIRONMENTAL IMPACT REPORT FOR THE LICENSING OF COMMERCIAL CANNABIS CULTIVATION IN MENDOCINO COUNTY PROJECT

Follow Up Flag: Follow up
Flag Status: Flagged

Department of Cannabis Control

Attention: Angela McIntire-Abbott

It is my understanding that you are involved with the preparation of an Environmental Impact Report for the Licensing of Commercial Cannabis Cultivation in Mendocino County.

We have lived in Redwood Valley for over thirty years and now have many concerns about the numerous cannabis permits in our area. We are concerned about aesthetics, air quality and water as well as crime (not an environmental effect) which all affect our quality of life and property values. We have loved living near vineyards, but cannabis is a completely different kind of neighbor. Whatever you can do through your EIR to minimize the negative effects will be greatly appreciated.

R Gary & Judith K Maddox

From: cynthia grant <cmackws@pacific.net>
Sent: Wednesday, August 30, 2023 3:49 PM
To: Public Comment@Cannabis
Subject: FW: EIR for the Licensing of Commercial Cannabis Cultivation in Mendocino County

Follow Up Flag: Follow up
Flag Status: Flagged

Department of Cannabis Control (DCC)

Attention: Angela McIntire-Abbott

Dept of Cannabis Control (DCC)

As a longtime resident and small business owner in Mendocino County

(specifically) Redwood Valley, I am writing to you regarding a possible Environmental Impact Report for the permitting of Commercial Cannabis Cultivation in our immediate residential area.

The immediate area in question is largely zoned Residential and is made up of 70 % single family residences.

There are many aspects to consider and while the term “Environmental” brings to mind hazardous materials such as pesticides, herbicides.

I would like to point out a much more dangerous aspect and that is the “Changing “of this neighborhood into an area of violent crime.

In a 2016 article printed in ‘Psychology Today it is noted that “cannabis use is associated with 7-fold greater odds for subsequent commission of violent crimes.”

There are many articles documenting crime rates rising drastically in areas of California where commercial cannabis is permitted.

People with antisocial personality traits and those with tendencies toward lawlessness may be the type of individuals inclined to use and grow cannabis.

I believe that Mendocino County government thinks that issuing permits to help regulate and control the Cannabis Growers in our area, will bring much needed revenue.
They are mistaken to think that they will accomplish this. The typical cannabis grower is not a “Law Abiding Citizen” per experts, and they will not be “regulated’ as the County hopes for.
Eighty percent of their product – whether they have a legal permitted grow or not – Is sold on the Black Market.
I don’t need to tell you what Black Market activity does to a community.
The law-abiding citizens, who report their income and pay taxes, will be driven out of their neighborhoods by the non-law-abiding cannabis Growers.
You see examples of this in every County, throughout California.
If you permit and allow the large Cannabis grows in Redwood Valley, you will see an exodus of the small business owners – like myself, as well as many other small businesses, who will not be able to live in this area that is populated with non-law-abiding folks and criminal activity.

The typical cannabis grower does not volunteer at the local Fire dept, they don’t pick up trash on the roadside – or check on their neighbor. They also don’t fully report or claim their income from their crop – As do the vineyard owners or other small business.
Actually – come harvest time the people they employ to harvest the crop deplete the Food Banks and Soup Kitchens in the area. They do not contribute financially to their community at all, unless they are trying to obtain a permit, to line their pockets with the monies from their product.

A local cannabis grower here is Redwood Valley attended a recent Board of Supervisors meeting to defend his position and pending permits to grow cannabis, in his neighborhood – which is again is made up of 70 percent single family residents.
He argued that he is a ‘Family Man” and a good citizen, citing that his wife is a Nurse at Kaiser Hospital. Since there is no such hospital in Mendocino County it is very evident that he does not live in this area, the area that he is cultivating his crops in. He instead lives in Sonoma County, far away from the negative issues we have pointed out with the Cannabis grows. Sonoma County quite probably will not allow him to operate his large cannabis operation.
Please consider this letter in your Environmental Impact Report and know that it is supported by many Redwood Valley residents and Business owners
Sincerely
Cynthia Grant / Richard Sagan

From: Lieshi Galandil <Gelennil@outlook.com>
Sent: Thursday, August 31, 2023 8:03 PM
To: Public Comment@Cannabis
Subject: Comments re: EIR for the Licensing of Commercial Cannabis Cultivation in Mendocino County

Follow Up Flag: Follow up
Flag Status: Flagged

I am writing this in response to a request for public comment on the State's proposed EIR for our county's commercial cannabis cultivation ordinance.

First, I am very pleased that the State Department of Cannabis Control has stepped in to help come up with a thorough, legitimate EIR for cannabis cultivation in this county.

The reason for this letter is that, now that there is a request for public input on this new process, and I have been listening to the call-ins and other public comments during the Scoping Meeting on August 22 and elsewhere, I am concerned that the only input you seem to be getting is from the cannabis growers themselves. I haven't heard any comments from community members like myself who are very concerned about preserving and restoring the natural environment that has already been greatly impacted by illegal grows all over the county and continue to be, particularly in the most remote, difficult to monitor areas of the county.

One thing that concerns me is that Mendocino County currently has no road ordinance in place for rural areas. There are already hundreds, if not thousands of illegal roads being cut every year in this county with no oversight or attempt to monitor the damage to wetlands, oak woodlands, animal habitats or even the extreme erosion they cause. Private land owners can cut as many roads as they want, apparently. This is one important item I would like the EIR to address.

Another is the fact that there is no current, meaningful, or long-term method to measure water use for individual cannabis cultivation parcels in the unincorporated areas of the county, or the cumulative, long-term impact on the surrounding environment and downstream waterways over decades. This year has been an unusually good rain year, but it has still not been enough to recharge the aquifers that supply the many rivers, streams and other water sources of this county. Despite what many growers say, marijuana, at least the way it is grown here, requires a very large amount of water daily. Cannabis nurseries require great quantities of water to regularly flush out their systems and then replace it. Sadly, because drought is the "new norm" in California (despite this year's anomaly), and the woods and wildlife that depend on our quickly-diminishing natural water supplies are already greatly stressed, we can't afford to use up (and pollute) more of this precious resource.

Illegal water diversion has been a common practice over decades in the remote areas of this county, robbing the natural rivers and streams of healthy flows and sending massive amounts of sediment (and pollutants) downstream from human-caused erosion. If a permit applicant can prove they have enough water, whether from wells or water storage, will there be a measure to determine its original source and the impact of their use on the surrounding or downstream,

hidden water sources? I do not think there has ever been a thorough study conducted in this county of the various streams and other water sources, let alone the changes they have undergone over the years, particularly due to cattle grazing, logging, and cannabis cultivation. The impacts and their causes are extensive and complex, and difficult to separate by type of use.

Finally, in the scoping meeting on August 22 I heard several commenters say they didn't want follow-up inspections performed by county cannabis officials to renew their licenses, that a notarized affidavit from the grower should be enough to show no new changes. They say that the surveillance cameras the county now uses to spot infractions should be enough, but in the most heavily wooded areas, I can assure you they are not. Please do not allow the removal of provisions for follow-up and/or random inspections on permitted cannabis cultivation and related operations sites.

Thank you for considering my input.

L. Galandil

From: Cyndi Barra Woskow <barrafamilyvineyards@comcast.net>
Sent: Thursday, August 24, 2023 1:46 PM
To: Public Comment@Cannabis
Subject: EIR for the Licensing of Commercial Cannabis Cultivation in Mendocino County

Follow Up Flag: Follow up
Flag Status: Flagged

Department of Cannabis Control (DCC)

Attention: Angela McIntire-Abbott

Our family has been long-time residents of Mendocino County (100+ years). We are grateful for the DCC's intent to conduct an Environmental Impact Repot (EIR) for the Licensing of Commercial Cannabis Cultivation in Mendocino County. Our comments and concerns regarding the cannabis impact on our community and quality of life are listed below:

Aesthetics: Numerous unsightly fences and hoop houses, with more being added all the time. Unsightly and often toxic debris from abandoned grow sites.

Agriculture & Forestry Resources: Some existing vineyard owners have been informed by wineries their fruit may be rejected if their vineyard is too close to cannabis grows that negatively affect grape quality for wine production. Introduction of new pests from cannabis crop to existing crops (mites, etc.).

Air Quality: Noxious odor permeates homes located next to cannabis grows and prevents homeowners from opening their windows in summer months to avoid the unpleasant odor, preventing homeowners from enjoying the fresh air in their own yard or patio. Light pollution from greenhouses adversely affects the night sky.

Geology & Soils: Hazardous products leach into the soil and water table.

Hazards & Hazardous Materials: Use of pesticides, herbicides, insecticides not safe to humans or the environment. For example… Ferric Sulfate, Bifenthrin, Carbofuran. Degraded plastics from hoop houses and associated plastic tubing, gas cans, propane tanks, firearms among other concerning items found at cannabis grow sites.

Hydrology & Water Quality: Water diversions from local rivers & streams deplete aquifers & existing wells that homeowners & local farmers depend on to exist & thrive. Water theft from existing wells, fire hydrants, local business, rivers and streams has been reported. Toxic pesticides, herbicides, insecticides & other materials contaminating our diminishing water sources. Ecosystems in rivers and streams (fish, birds, frogs, etc.) are disrupted by these water diversions and toxic contaminates in our local water ways.

Land Use & Planning: Cannabis grows located too close to existing homes deflates home values, invites illegal activity to neighboring homes, affects views from existing homes who used to see mountains & now see fences & hoop houses. All of this negatively affects the quality of life for existing homeowners who have significant investment in their properties.

Noise: Noise pollution from generators, dehumidifiers, fans, & water trucks.

Population & Housing: Big money infiltrating the housing market inflates real estate prices and reduces available housing for local residents. Buyers from out of the area seeking to profit from the cannabis industry are often not very neighborly or community minded. Cannabis properties often have guard dogs that bark and bark and bark, which is a noise nuisance degrading the neighborhood. A crop that requires guard dogs, fences and firearms is not compatible with our peaceful community environment.

Public Services: Cannabis industry is taxing our Public Safety agencies, depleting services and funds that are desperately needed in other parts of our community.

Recreation: Fear by outdoor enthusiast to use public & private lands for outdoor recreation (hiking, fishing, camping, etc.) due to hostile encounters from cannabis grows.

Transportation: Large trucks & increased traffic on local roads causing untimely maintenance that there is no funding for. This increased traffic also causes our small rural roads to be less safe for pedestrians, cyclists, horseback riders, and other drivers.

Utilities & Service System: Increased strain on our electrical grid & water districts.

Wildfire: Remote cannabis grows, especially clandestine ones, contribute to wildfire dangers because they may go unreported and be difficult to access by fire crews.

We believe these stated concerns confirm we desperately need a thorough EIR to evaluate the adverse impact of cannabis cultivation operations in Mendocino County.

Sincerely,

Lori Barra
Cynthia Barra Woskow
Christina Barra
9901 East Road
Redwood Valley, CA 95470

From: Pete's Tractor & Pump, Inc. <petestractor@yahoo.com>
Sent: Thursday, August 24, 2023 4:18 PM
To: Public Comment@Cannabis
Subject: Attn: Angela McIntire-Abbott regarding EIR for the Licensing of Commercial Cannabis Cultivation in Mendocino County

Follow Up Flag: Follow up
Flag Status: Flagged

Good Afternoon Ms. McIntire-Abbott,

This letter is in regards to the State Department of Cannabis Control intent to prepare a draft Environmental Impact Report (EIR) for the Licensing of Commercial Cannabis Cultivation in Mendocino County.

My wife, Tanya and I have 60 acres in the heart of Redwood Valley. Our homes and our vineyards are right in the middle of cannabis greenhouses. We were here before this activity started crowding our area. Together my wife and I have built our business with our blood, sweat, and tears. We did it on our own, with no inherited wealth, and by doing everything by the book.

In the 20 plus years we have been here, we have worked together with our neighbors to find solutions to our issues. Collaboration and compromise have made Redwood Valley what it is today. We attempted to maintain this level of cooperation and courtesy with the people that moved into our area and that same attitude was not returned to us.

Our lives are impacted by the cannabis operations surrounding our homes. As is common courtesy on our road, we check in with our neighbors before doing certain things to make sure it will not greatly impact or harm them. We had approached these cannabis growers before they started to prepare their sites for hoop houses politely asking them to consider our opinions, such as placing greenhouses further back on the property to help keep the smell as far away from us and our vineyard as possible and we were met with no compromise. I even went so far as to offer free service and help, like grading sections of others property, to make this agreeable but there has been no effort to work with us. A major concern we have is of the stench that comes from the cannabis tainting our grapes which could put our grape harvest in jeopardy with the wineries. Another major concern we have is where we've seen how they place their greenhouses as close to water sources as possible. For an example one went in close to a Freshwater Pond and another near Freshwater Forested/Shrub wetland. One site also drilled a well near an adjacent residential well of a home that

depends on well water only. Too many homes in our area rely on well water only, so the Environmental Impact Report as pertains to water quantity and quality should be done and a way to continually monitor them after the EIR is put into place.

The cannabis grows plague our community with stench year-round, stacks of hoop houses block our once scenic view, and they disrupt our fragile water systems. Growing grapes is our livelihood. We don't have to guard our vineyard for fear of intruders and theft. Never have we seen such riff raff tooling around the valley until these grows evolved. The bottom line is that we are not okay with what is happening in our piece of Redwood Valley. We have taken action in the process the Board has afforded constituents in hopes that a re-zone would take place. However, unfortunately our board of supervisors did not allow for this to happen. We want to keep our homes and community as a place for the next generation, a safe place for our grandchildren.
I ask that you listen to the community and the overwhelming support for the concerns we have regarding the impact not only environmentally but also for the quality of life not to mention the crime that goes hand in hand with these cannabis grows surrounding our once beautiful valley.

Thank you for your time,

Pete & Tanya Lucchesi
707-272-0474

From: Marnie Birger <kookeeme@aol.com>
Sent: Thursday, August 31, 2023 4:39 PM
To: Public Comment@Cannabis
Subject: CEQA EIR public comments

Follow Up Flag: Follow up
Flag Status: Flagged

8/31/2023

Dear DCC, Ascent, and all interested parties,

We read the notice of preparation and we understand the focus as it was stated for the scoping process, "The EIR will programmatically evaluate the environmental impacts of the DCC's annual licensing of commercial cannabis cultivation operations in the county as well as the environmental impacts of future licensed commercial cannabis cultivation operations."

We listened to the State scoping meeting and we have read the letter to the Mendocino BOS from Director Nicole Elliot of the DCC regarding the CEQA process. We appreciate the State stepping into partnership with our County geared at transitioning the Phase One cohort from Provisional to Annual licenses.

We're located in Covelo, Round Valley.

We request that the scope of the State CEQA EIR delineate the difference between Phase One farms, who all had to prove prior cultivation to qualify for Phase One. Phase One farms having to prove prior cultivation to even qualify for Phase One is a very important point.

We understand that farms that are looking to expand, and especially new cultivation sites being considered in Phase Three, will likely have to do additional environmental reports to guarantee that they fall within the scope of the EIR. 10,000 sq ft or less is a small farm. I request the state see the treasure of this craft community for the benefit of every Californian. Connoisseurs want craft cannabis. Protect and embrace the remaining farmers.

We strongly believe Phase One farms should be exempt, or grandfathered into CEQA approval via the EIR. These small farms have already completed the required environmental assessments, have already been inspected by the various County and State agencies, and in many cases, are already approved, or in a queue with their documents ready and waiting to be approved.

Using multiple pathways for CEQA will ensure the highest number of farms can achieve their State annual license. Finding a way to accept Appendix G documents will help the DCC process those in the program who have already completed the checklist.

Using the MND is imperative. It was written to cover upward of 10,000 small farms and we have less than 1000 small farms using approximately 200 acres of land right now in Mendocino as part of Phase One of our ordinance. These numbers are notable, especially when cannabis cultivation is compared to other agricultural crops in our County, such as the **16,000+ acres of grape vines.**

We heard at the scoping meeting, and as stated in the quote from the DCC above, the EIR will take into account all cannabis activities present and future. We believe the proof of prior cultivation, and therefore, every single farm in the Phase One cohort, with an emphasis on those who have not expanded since the ordinance passed or who have done so with proper approvals, are covered under the prior MND.

As you know, 10,000 sq ft and under, is considered by the State as a small farm, and anything above it is classified as a medium or large farm in the California cannabis sector. Our farm, like many in Mendocino County, is also completely **outdoor.** One crop, One season, with nature. We implement Best Management Practices, JADAM natural farming, regenerative farming practices. Mendocino County has a rich history of sustainable agriculture as a center of the back-to-the-land movement. We were the were the first County in the USA to vote for non-gmo standards regarding commercial crops. We are the environmentalists. Many, if not all of the Phase One farms that are active in the local cannabis program are longtime stewards of the land. **These types of documented best management practices should also count toward exemptions from CEQA. The requirements have already been fulfilled.**

Thank you for allowing public input and considering our comments.

Marnie Birger

Department of Cannabis Control
c/o Angela McIntire-Abbott
2920 Kilgore Road
Rancho Cordova, CA 95670

August 31, 2023

Sent via email to publiccomment@cannabis.ca.gov

RE: DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE LICENSING OF COMMERCIAL CANNABIS CULTIVATION IN MENDOCINO COUNTY PROJECT

Ms. McIntire-Abbott,

The Mendocino Cannabis Alliance[1] (MCA) appreciates the opportunity to provide comment on the DCC's Notice of Preparation for the upcoming Environmental Impact Report on Mendocino County's cannabis cultivation state licensing.

It is noteworthy that the Mitigated Negative Declaration (MND)[2] for this County program anticipated up to 10,000 individual cultivation sites in all zones throughout Mendocino County. In the NOP, it is identified that the DCC has issued 608 Provisional Licenses thus far to local operators. Based on the most recent reporting[3] by the Mendocino Cannabis Department, we see a total of 827 active local Licenses or Applications. This number is down 34% from nearly 1300 total in 2020 at which point the Mendocino County Cannabis Crop Report Addendum[4] identified 290 acres of licensed canopy. Using the same math **it is not unreasonable to infer that our locally licensed canopy is now closer to 200 acres, which is less than one third of one square mile,** in a county of 3,878 square miles**.** By comparison, the 2021 Mendocino Crop Report identifies 16,500 acres of wine grapes in the County, or nearly 26 square miles.

What these numbers illustrate is the lack of significant impact created by this program, especially compared to what was originally projected and accounted for in the MND. This industry could increase in size 4x and still have only 5% of the footprint of local winegrape production. In this overall context of a lack of significant impact, we encourage the State and Ascent to consider the following recommendations:

1. The analysis should only include the impacts of all pre-existing and current activity, as well as future licensed site development, while distinguishing between the two different types. We do not want the cumulative impacts to be too great, while at the same time providing opportunities for sustainable development.

[1] https://mendocannabis.com/

[2] https://drive.google.com/file/d/1vp0-nwb5rc0Vu6Fn7_fyDUK7x_GYuKeU/view?usp=drive_link

[3] https://mendocino.legistar1.com/daystar.legistar6.sdk.ws/View.ashx?M=F&GovernmentGUID=MEND&LogicalFileName=5654eb50-c6d5-486e-8bfd-b97a1bf3a919.docx&From=Granicus

[4] https://mendocino.legistar.com/View.ashx?M=F&ID=10434646&GUID=CF10EE68-2412-487D-B161-9702223D8530

2. Include comparisons to other types of food and agricultural production in Mendocino County to provide the context of definition of significant or insignificant impact.

3. Include information on existing and overlapping Phase 1 requirements from all agencies related to items such as water source, regulations, diversion, land management practices, sediment, impacts to species and habitat, and other areas that are addressed by existing regulations

4. Include licensees water storage methods such as tanks and ponds as mitigating wildfire exposure.

5. Consider sustainable and regenerative farming and business practices employed by many local cultivators as environmental benefits that mitigate impact, as evidenced in some, but not all, cases by third party certifications such as the State sponsored OCal Comparable to the National Organic Program administered by CDFA[5], Sun + Earth Certified[6], Clean Green Certified[7] and others.

6. Consider, and account for, the many farms that are part of the Homestead movement in which operators live at their project sites. In our producer county most farmers are also residents on their sites, which helps reduce needed mitigation measures.

MCA is available to discuss and to give further input to the DCC and Ascent in their consideration of the Draft EIR for State Annual cultivation licensing in the context of the particularities of Mendocino County.

Sincerely,

Mendocino Cannabis Alliance
e: info@mendocannabis.com
p: 707.234.5568

cc: haschakj@mendocinocounty.org
mulherenm@mendocinocounty.org
curtisc@mendocinocounty.org
kiedrowskim@mendocinocounty.org
goinesm@mendocinocounty.org
mcburneys@mendocinocounty.org

5 https://www.cdfa.ca.gov/is/ocal.html
6 https://sunandearth.org/
7 https://cleangreencertified.com/

NATIVE AMERICAN HERITAGE COMMISSION

NAHC HEADQUARTERS
1550 Harbor Boulevard
Suite 100
West Sacramento,
California 95691
(916) 373-3710
nahc@nahc.ca.gov
NAHC.ca.gov

August 2, 2023

Angela McIntire-Abbott
Department of Cannabis Control
2920 Kilgore Rd.
Rancho Cordova, CA 95670

Re: 2023080049, Mendocino County Cannabis Licensing Project, Multiple Counties

Dear Ms. McIntire-Abbott:

The Native American Heritage Commission (NAHC) has received the Notice of Preparation (NOP), Draft Environmental Impact Report (DEIR) or Early Consultation for the project referenced above. The California Environmental Quality Act (CEQA) (Pub. Resources Code §21000 et seq.), specifically Public Resources Code §21084.1, states that a project that may cause a substantial adverse change in the significance of a historical resource, is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.1; Cal. Code Regs., tit.14, §15064.5 (b) (CEQA Guidelines §15064.5 (b)). If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, an Environmental Impact Report (EIR) shall be prepared. (Pub. Resources Code §21080 (d); Cal. Code Regs., tit. 14, § 5064 subd.(a)(1) (CEQA Guidelines §15064 (a)(1)). In order to determine whether a project will cause a substantial adverse change in the significance of a historical resource, a lead agency will need to determine whether there are historical resources within the area of potential effect (APE).

CEQA was amended significantly in 2014. Assembly Bill 52 (Gatto, Chapter 532, Statutes of 2014) (AB 52) amended CEQA to create a separate category of cultural resources, "tribal cultural resources" (Pub. Resources Code §21074) and provides that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment. (Pub. Resources Code §21084.2). Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource. (Pub. Resources Code §21084.3 (a)). **AB 52 applies to any project for which a notice of preparation, a notice of negative declaration, or a mitigated negative declaration is filed on or after July 1, 2015.** If your project involves the adoption of or amendment to a general plan or a specific plan, or the designation or proposed designation of open space, on or after March 1, 2005, it may also be subject to Senate Bill 18 (Burton, Chapter 905, Statutes of 2004) (SB 18). **Both SB 18 and AB 52 have tribal consultation requirements.** If your project is also subject to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.) (NEPA), the tribal consultation requirements of Section 106 of the National Historic Preservation Act of 1966 (154 U.S.C. 300101, 36 C.F.R. §800 et seq.) may also apply.

The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of your proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources. Below is a brief summary of portions of AB 52 and SB 18 as well as the NAHC's recommendations for conducting cultural resources assessments.

Consult your legal counsel about compliance with AB 52 and SB 18 as well as compliance with any other applicable laws.

AB 52

AB 52 has added to CEQA the additional requirements listed below, along with many other requirements:

1. Fourteen Day Period to Provide Notice of Completion of an Application/Decision to Undertake a Project: Within fourteen (14) days of determining that an application for a project is complete or of a decision by a public agency to undertake a project, a lead agency shall provide formal notification to a designated contact of, or tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, to be accomplished by at least one written notice that includes:

- **a.** A brief description of the project.
- **b.** The lead agency contact information.
- **c.** Notification that the California Native American tribe has 30 days to request consultation. (Pub. Resources Code §21080.3.1 (d)).
- **d.** A "California Native American tribe" is defined as a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of Statutes of 2004 (SB 18). (Pub. Resources Code §21073).

2. Begin Consultation Within 30 Days of Receiving a Tribe's Request for Consultation and Before Releasing a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report: A lead agency shall begin the consultation process within 30 days of receiving a request for consultation from a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project. (Pub. Resources Code §21080.3.1, subds. (d) and (e)) and prior to the release of a negative declaration, mitigated negative declaration or Environmental Impact Report. (Pub. Resources Code §21080.3.1(b)).

- **a.** For purposes of AB 52, "consultation shall have the same meaning as provided in Gov. Code §65352.4 (SB 18). (Pub. Resources Code §21080.3.1 (b)).

3. Mandatory Topics of Consultation If Requested by a Tribe: The following topics of consultation, if a tribe requests to discuss them, are mandatory topics of consultation:

- **a.** Alternatives to the project.
- **b.** Recommended mitigation measures.
- **c.** Significant effects. (Pub. Resources Code §21080.3.2 (a)).

4. Discretionary Topics of Consultation: The following topics are discretionary topics of consultation:

- **a.** Type of environmental review necessary.
- **b.** Significance of the tribal cultural resources.
- **c.** Significance of the project's impacts on tribal cultural resources.
- **d.** If necessary, project alternatives or appropriate measures for preservation or mitigation that the tribe may recommend to the lead agency. (Pub. Resources Code §21080.3.2 (a)).

5. Confidentiality of Information Submitted by a Tribe During the Environmental Review Process: With some exceptions, any information, including but not limited to, the location, description, and use of tribal cultural resources submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public, consistent with Government Code §6254 (r) and §6254.10. Any information submitted by a California Native American tribe during the consultation or environmental review process shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public. (Pub. Resources Code §21082.3 (c)(1)).

6. Discussion of Impacts to Tribal Cultural Resources in the Environmental Document: If a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document shall discuss both of the following:

- **a.** Whether the proposed project has a significant impact on an identified tribal cultural resource.
- **b.** Whether feasible alternatives or mitigation measures, including those measures that may be agreed to pursuant to Public Resources Code §21082.3, subdivision (a), avoid or substantially lessen the impact on the identified tribal cultural resource. (Pub. Resources Code §21082.3 (b)).

7. Conclusion of Consultation: Consultation with a tribe shall be considered concluded when either of the following occurs:

a. The parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or

b. A party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. (Pub. Resources Code §21080.3.2 (b)).

8. Recommending Mitigation Measures Agreed Upon in Consultation in the Environmental Document: Any mitigation measures agreed upon in the consultation conducted pursuant to Public Resources Code §21080.3.2 shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program, if determined to avoid or lessen the impact pursuant to Public Resources Code §21082.3, subdivision (b), paragraph 2, and shall be fully enforceable. (Pub. Resources Code §21082.3 (a)).

9. Required Consideration of Feasible Mitigation: If mitigation measures recommended by the staff of the lead agency as a result of the consultation process are not included in the environmental document or if there are no agreed upon mitigation measures at the conclusion of consultation, or if consultation does not occur, and if substantial evidence demonstrates that a project will cause a significant effect to a tribal cultural resource, the lead agency shall consider feasible mitigation pursuant to Public Resources Code §21084.3 (b). (Pub. Resources Code §21082.3 (e)).

10. Examples of Mitigation Measures That, If Feasible, May Be Considered to Avoid or Minimize Significant Adverse Impacts to Tribal Cultural Resources:

a. Avoidance and preservation of the resources in place, including, but not limited to:

i. Planning and construction to avoid the resources and protect the cultural and natural context.

ii. Planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.

b. Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:

i. Protecting the cultural character and integrity of the resource.

ii. Protecting the traditional use of the resource.

iii. Protecting the confidentiality of the resource.

c. Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.

d. Protecting the resource. (Pub. Resource Code §21084.3 (b)).

e. Please note that a federally recognized California Native American tribe or a non-federally recognized California Native American tribe that is on the contact list maintained by the NAHC to protect a California prehistoric, archaeological, cultural, spiritual, or ceremonial place may acquire and hold conservation easements if the conservation easement is voluntarily conveyed. (Civ. Code §815.3 (c)).

f. Please note that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated. (Pub. Resources Code §5097.991).

11. Prerequisites for Certifying an Environmental Impact Report or Adopting a Mitigated Negative Declaration or Negative Declaration with a Significant Impact on an Identified Tribal Cultural Resource: An Environmental Impact Report may not be certified, nor may a mitigated negative declaration or a negative declaration be adopted unless one of the following occurs:

a. The consultation process between the tribes and the lead agency has occurred as provided in Public Resources Code §21080.3.1 and §21080.3.2 and concluded pursuant to Public Resources Code §21080.3.2.

b. The tribe that requested consultation failed to provide comments to the lead agency or otherwise failed to engage in the consultation process.

c. The lead agency provided notice of the project to the tribe in compliance with Public Resources Code §21080.3.1 (d) and the tribe failed to request consultation within 30 days. (Pub. Resources Code §21082.3 (d)).

The NAHC's PowerPoint presentation titled, "Tribal Consultation Under AB 52: Requirements and Best Practices" may be found online at: http://nahc.ca.gov/wp-content/uploads/2015/10/AB52TribalConsultation_CalEPAPDF.pdf

SB 18

SB 18 applies to local governments and requires local governments to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space. (Gov. Code §65352.3). Local governments should consult the Governor's Office of Planning and Research's "Tribal Consultation Guidelines," which can be found online at: https://www.opr.ca.gov/docs/09_14_05_Updated_Guidelines_922.pdf.

Some of SB 18's provisions include:

1. Tribal Consultation: If a local government considers a proposal to adopt or amend a general plan or a specific plan, or to designate open space it is required to contact the appropriate tribes identified by the NAHC by requesting a "Tribal Consultation List." If a tribe, once contacted, requests consultation the local government must consult with the tribe on the plan proposal. **A tribe has 90 days from the date of receipt of notification to request consultation unless a shorter timeframe has been agreed to by the tribe.** (Gov. Code §65352.3 (a)(2)).
2. No Statutory Time Limit on SB 18 Tribal Consultation. There is no statutory time limit on SB 18 tribal consultation.
3. Confidentiality: Consistent with the guidelines developed and adopted by the Office of Planning and Research pursuant to Gov. Code §65040.2, the city or county shall protect the confidentiality of the information concerning the specific identity, location, character, and use of places, features and objects described in Public Resources Code §5097.9 and §5097.993 that are within the city's or county's jurisdiction. (Gov. Code §65352.3 (b)).
4. Conclusion of SB 18 Tribal Consultation: Consultation should be concluded at the point in which:
    a. The parties to the consultation come to a mutual agreement concerning the appropriate measures for preservation or mitigation; or
    b. Either the local government or the tribe, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached concerning the appropriate measures of preservation or mitigation. (Tribal Consultation Guidelines, Governor's Office of Planning and Research (2005) at p. 18).

Agencies should be aware that neither AB 52 nor SB 18 precludes agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52 and SB 18. For that reason, we urge you to continue to request Native American Tribal Contact Lists and "Sacred Lands File" searches from the NAHC. The request forms can be found online at: http://nahc.ca.gov/resources/forms/.

NAHC Recommendations for Cultural Resources Assessments

To adequately assess the existence and significance of tribal cultural resources and plan for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources, the NAHC recommends the following actions:

1. Contact the appropriate regional California Historical Research Information System (CHRIS) Center (https://ohp.parks.ca.gov/?page_id=30331) for an archaeological records search. The records search will determine:
    a. If part or all of the APE has been previously surveyed for cultural resources.
    b. If any known cultural resources have already been recorded on or adjacent to the APE.
    c. If the probability is low, moderate, or high that cultural resources are located in the APE.
    d. If a survey is required to determine whether previously unrecorded cultural resources are present.

2. If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
    a. The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum and not be made available for public disclosure.
    b. The final written report should be submitted within 3 months after work has been completed to the appropriate regional CHRIS center.

3. Contact the NAHC for:
   a. A Sacred Lands File search. Remember that tribes do not always record their sacred sites in the Sacred Lands File, nor are they required to do so. A Sacred Lands File search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with the geographic area of the project's APE.
   b. A Native American Tribal Consultation List of appropriate tribes for consultation concerning the project site and to assist in planning for avoidance, preservation in place, or, failing both, mitigation measures.

4. Remember that the lack of surface evidence of archaeological resources (including tribal cultural resources) does not preclude their subsurface existence.
   a. Lead agencies should include in their mitigation and monitoring reporting program plan provisions for the identification and evaluation of inadvertently discovered archaeological resources per Cal. Code Regs., tit. 14, §15064.5(f) (CEQA Guidelines §15064.5(f)). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources should monitor all ground-disturbing activities.
   b. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the disposition of recovered cultural items that are not burial associated in consultation with culturally affiliated Native Americans.
   c. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the treatment and disposition of inadvertently discovered Native American human remains. Health and Safety Code §7050.5, Public Resources Code §5097.98, and Cal. Code Regs., tit. 14, §15064.5, subdivisions (d) and (e) (CEQA Guidelines §15064.5, subds. (d) and (e)) address the processes to be followed in the event of an inadvertent discovery of any Native American human remains and associated grave goods in a location other than a dedicated cemetery.

If you have any questions or need additional information, please contact me at my email address: Cameron.Vela@nahc.ca.gov

Sincerely,

Cameron Vela

Cameron Vela
Cultural Resources Analyst

cc: State Clearinghouse

From: Frances and Jim Owen <owen-family@comcast.net>
Sent: Thursday, August 31, 2023 10:27 AM
To: Public Comment@Cannabis
Subject: Intent to Draft EIR Mendocino County Attention: Angela

Follow Up Flag: Follow up
Flag Status: Flagged

Attention: Angela McIntire-Abbott
Re: State intent to draft EIRs for licensing of Commercial cannabis in Mendocino County.

We are local Redwood Valley residents of 44 years and are very concerned about the effects Commercial cannabis is having on our local community and we would like to see these addressed with an EIR prior to issuance of annual Commercial Cannabis Cultivation permits in Mendocino County.

First and foremost, given our drought years and global warming, we are extremely concerned about water usage. Many of us are on well water only and last summer we heard of at least 2 residential wells that went dry which had never gone dry before, in one case in 50 years!!. One is very close to big hoop house grows that went in and close to the Russian River that supplies water to many communities further south of this area. Thankfully, we had a wet winter and these wells recovered, but there is no guarantee this will not continue to happen. And wells are being drilled, they should not be allowed to drill wells. Existing vineyards use ponds and are sensitive to residential well water use and needs. Water is also trucked in: noise and roads are literally going to "pot." These big grows are being allowed too close to residential areas and are causing numerous problems, in addition to using too much water. Namely: Visual blight and visual obstruction, hoop houses and fences going up all over the place. Not good for our mental well being. We worry about wildlife. The plastic hoop houses are not good for the environment. They emit gasses and the plastics degrade. The smell restricts our usage of our own properties and people with allergies really suffer. Increased traffic and strangers in the area, many concerns over our safety. We could go on, but hopefully you're hearing from many other people throughout Mendocino County.

Do the darn EIRs please! We assume you'll publish your findings?

Sincerely,

Jim and Frances Owen
2230 Road E
Redwood Valley, CA 95470

From: Covelo Son Grown, LLC <covelosongrown@gmail.com>
Sent: Thursday, August 24, 2023 9:05 AM
To: Public Comment@Cannabis
Subject: Mendocino County Annual License Morass

Follow Up Flag: Follow up
Flag Status: Flagged

[EXTERNAL]: covelosongrown@gmail.com

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To Whom It MAy Concern,

I am a 2nd generation, legacy, cannabis cultivator, born and raised in Covelo, CA. I have been seeking a license since Mendocino County re-issued the 9.31 program, which was one of the first attempts to regulate and allow the cultivation of cannabis in a "legal" manner. Before this most cultivation was done under the umbrella of Prop 215, the medical marijuana proposition, which really worked alot better than what we see now--except the County and State didn't get much tax revenue.

I am writing today to express my anger over the treatment that I and my fellow cultivators have received since the inception of Proposition 64. It is clear that the proposition was not well thought out and it is also clear that it was simply an underhanded way to replace Proposition 215, which many CA politicians did not agree with, since it deftly avoided the over taxation that is destroying the current model we see today.

My concern is that this long and protracted process of reaching a finalized version of a cultivation license/permit has exceeded the value that it brings to a farmer. Beside spending unreasonable amounts of money on legal support and unnecessary environmental consultations, most of us STILL do not have the license to grow what is clearly a plant, that clearly has no more impact on the environment than an onion, tomato or potato, yet is treated like its some type of hazardous waste.

My biggest complaint and concern however is that the rules for the scale of a cannabis business were made when the value of cannabis was much higher than it is now. Under State law a single Outdoor License can be up to 1 acre, a very reasonable scale for a small farmer. As an outdoor (full term) farmer, I agree with limits to indoor scale and greenhouse scale as both of those practices require significantly more infrastructure development and energy use than does an outdoor farm. My concern now, after years of waiting and expense that has diverted money from my farm to the pockets of the State, County and Consultants is that the scale we are locked into is not sufficient to make up for the dramatic drop in value of cannabis products (all types) and the total expense of trying to become legal in the first place.

This problem is not just impacting the cultivator as well. It impacts the citizens of our County because the primary economic driver in the rural areas of Mendocino are completely linked to the outcome (or lack thereof) of this streamlining process. I would say that the time has come to reward the cultivators who are still footing the bill for this process by allowing them to scale up to 1 acre and then providing them with the Annual License that should have been much less expensive and troublesome to receive in the first place.
Sincerely,

Rio Cardone
Owner Covelo Son Grown, LLC

From: Ronald Ford <kannford09@comcast.net>
Sent: Saturday, August 19, 2023 12:48 PM
To: Public Comment@Cannabis
Cc: ronaldford
Subject: Cannabis Proliferation

Follow Up Flag: Follow up
Flag Status: Flagged

C/O Angela McIntire-Abbott

Department Leaders,

I have lived in Redwood Valley, Mendocino County, except for college and military service, for the last 85 years. I am very concerned about agriculture and forestry resources, hydrology and water quality, land use and planning, tribal and cultural resources, and availability of water per se. Please help with EIR's

Sincerely, Ronald K. Ford

From: stephen <tsminin@gmail.com>
Sent: Saturday, August 19, 2023 11:19 AM
To: Public Comment@Cannabis
Subject: EIR/CEQA Review

[EXTERNAL]: tsminin@gmail.com

CAUTION: THIS EMAIL ORIGINATED OUTSIDE THE DEPARTMENT OF CANNABIS CONTROL!
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Hello.

As a cultivator in Mendocino County holding two Provisional Adult Specialty Outdoor Licenses (CCL 18-0002141, CCL 20-0001824) I was told by the county to complete an EIR/CEQA study on my property. I did so at the cost of over $20,000. I've submitted all information to the county. My question is, will the new DCC guidelines force me to complete a new study or will DCC use the study (for my purposes) that I've already submitted to Mendocino County?
Thank you for your reply.
Respecfully,
Stephen Cato
530-713-4568
tsminin@gmail.com

Monday, August 28th, 2023

From: Willits Environmental Center
630 South Main Street
Willits CA 95490
wece@sbcglobal.net
707-459-2643

To: Department of Cannabis Control c/o Angela McIntire-Abbott
2920 Kilgore Rd.
Rancho Cordova, Ca 95670
info@cannabis.ca.gov
or
publiccomment@cannabis.ca.gov

Re: Comments/Question Regarding the Notice of Preparation and Public Scoping For A Draft Environmental Impact Report For The Licensing of Commercial Cannabis Cultivation In Mendocino County Project

Dear Ms. McIntire-Abbott;

On behalf of the Willits Environmental Center I am submitting the following questions/comments on the above referenced Project:

1. Has the State done "Projects" in other Counties similar to what is being proposed in Mendocino County, or is this "Project" unique to Mendocino County?

2. On what basis will the DCC determine if there is the potential for significant environmental impacts from granting a State license to an individual Mendocino County cannabis cultivation applicant?

3. What will come first - the granting of a County permit (or license) to cultivate cannabis, or the DCC's granting a State license to a Mendocino County cannabis cultivation applicant? Which licensing entity will act first? Will the issuance of one license be dependent on the prior issuance of the other?

4. How will the DCC evaluate cumulative impacts of current and future growers?

5. How will the DCC establish a "baseline" condition in the County? Will current conditions of the EIR CEQA "checklist" categories be assessed throughout the areas of the County affected by cannabis cultivation? Wouldn't such an undertaking require at least one full year to capture existing plant, fish and wildlife conditions, and the potential impacts of past present and future cannabis operations on these resources?

6. How will the DCC incorporate Mendocino County's existing cannabis cultivation and land use statutes into its assessment. Will the DCC assess the success and/or failures Mendocino County's enforcement of its existing cannabis cultivation statutes as part of the DEIR?

7.What entity will be responsible for ground-truthing individual cultivation sites, and how will that be done?

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9. Was Mendocino County simply unwilling, or unable, to determine whether or not applicants would individually or cumulatively harm the environment, and therefore the State is stepping in in order to get current and future cannabis cultivators licensed, in business, and paying taxes?

10. Has this situation occurred in any other County? If so, please refer me to the DCC's other county's EIR documents.

11. Why will the "Project" cost $5 million?

12. Will this State/DCC "Project" process and ultimate issuing of State licenses to Mendocino County growers, present and future, in any way alter the County's current statutes regulating cannabis cultivation and associated activities?

Thank you very much for your response to these questions. We look forward to a better understanding of this process as it affects the natural and human environment of Mendocino County, and to our continuing involvement in its unfolding.

Sincerely
Ellen Drell, for the Willits Environmental Center, wece@sbcglobal.net
707-459-2643

NATIVE AMERICAN HERITAGE COMMISSION

NAHC HEADQUARTERS
1550 Harbor Boulevard
Suite 100
West Sacramento,
California 95691
(916) 373-3710
nahc@nahc.ca.gov
NAHC.ca.gov

August 2, 2023

Angela McIntire-Abbott
Department of Cannabis Control
2920 Kilgore Rd.
Rancho Cordova, CA 95670

Re: 2023080049, Mendocino County Cannabis Licensing Project, Multiple Counties

Dear Ms. McIntire-Abbott:

The Native American Heritage Commission (NAHC) has received the Notice of Preparation (NOP), Draft Environmental Impact Report (DEIR) or Early Consultation for the project referenced above. The California Environmental Quality Act (CEQA) (Pub. Resources Code §21000 et seq.), specifically Public Resources Code §21084.1, states that a project that may cause a substantial adverse change in the significance of a historical resource, is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.1; Cal. Code Regs., tit.14, §15064.5 (b) (CEQA Guidelines §15064.5 (b)). If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, an Environmental Impact Report (EIR) shall be prepared. (Pub. Resources Code §21080 (d); Cal. Code Regs., tit. 14, § 5064 subd.(a)(1) (CEQA Guidelines §15064 (a)(1)). In order to determine whether a project will cause a substantial adverse change in the significance of a historical resource, a lead agency will need to determine whether there are historical resources within the area of potential effect (APE).

CEQA was amended significantly in 2014. Assembly Bill 52 (Gatto, Chapter 532, Statutes of 2014) (AB 52) amended CEQA to create a separate category of cultural resources, "tribal cultural resources" (Pub. Resources Code §21074) and provides that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment. (Pub. Resources Code §21084.2). Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource. (Pub. Resources Code §21084.3 (a)). **AB 52 applies to any project for which a notice of preparation, a notice of negative declaration, or a mitigated negative declaration is filed on or after July 1, 2015.** If your project involves the adoption of or amendment to a general plan or a specific plan, or the designation or proposed designation of open space, on or after March 1, 2005, it may also be subject to Senate Bill 18 (Burton, Chapter 905, Statutes of 2004) (SB 18). **Both SB 18 and AB 52 have tribal consultation requirements.** If your project is also subject to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.) (NEPA), the tribal consultation requirements of Section 106 of the National Historic Preservation Act of 1966 (154 U.S.C. 300101, 36 C.F.R. §800 et seq.) may also apply.

The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of your proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources. Below is a brief summary of portions of AB 52 and SB 18 as well as the NAHC's recommendations for conducting cultural resources assessments.

Consult your legal counsel about compliance with AB 52 and SB 18 as well as compliance with any other applicable laws.

AB 52

AB 52 has added to CEQA the additional requirements listed below, along with many other requirements:

1. Fourteen Day Period to Provide Notice of Completion of an Application/Decision to Undertake a Project: Within fourteen (14) days of determining that an application for a project is complete or of a decision by a public agency to undertake a project, a lead agency shall provide formal notification to a designated contact of, or tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, to be accomplished by at least one written notice that includes:

- **a.** A brief description of the project.
- **b.** The lead agency contact information.
- **c.** Notification that the California Native American tribe has 30 days to request consultation. (Pub. Resources Code §21080.3.1 (d)).
- **d.** A "California Native American tribe" is defined as a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of Statutes of 2004 (SB 18). (Pub. Resources Code §21073).

2. Begin Consultation Within 30 Days of Receiving a Tribe's Request for Consultation and Before Releasing a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report: A lead agency shall begin the consultation process within 30 days of receiving a request for consultation from a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project. (Pub. Resources Code §21080.3.1, subds. (d) and (e)) and prior to the release of a negative declaration, mitigated negative declaration or Environmental Impact Report. (Pub. Resources Code §21080.3.1(b)).

- **a.** For purposes of AB 52, "consultation shall have the same meaning as provided in Gov. Code §65352.4 (SB 18). (Pub. Resources Code §21080.3.1 (b)).

3. Mandatory Topics of Consultation If Requested by a Tribe: The following topics of consultation, if a tribe requests to discuss them, are mandatory topics of consultation:

- **a.** Alternatives to the project.
- **b.** Recommended mitigation measures.
- **c.** Significant effects. (Pub. Resources Code §21080.3.2 (a)).

4. Discretionary Topics of Consultation: The following topics are discretionary topics of consultation:

- **a.** Type of environmental review necessary.
- **b.** Significance of the tribal cultural resources.
- **c.** Significance of the project's impacts on tribal cultural resources.
- **d.** If necessary, project alternatives or appropriate measures for preservation or mitigation that the tribe may recommend to the lead agency. (Pub. Resources Code §21080.3.2 (a)).

5. Confidentiality of Information Submitted by a Tribe During the Environmental Review Process: With some exceptions, any information, including but not limited to, the location, description, and use of tribal cultural resources submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public, consistent with Government Code §6254 (r) and §6254.10. Any information submitted by a California Native American tribe during the consultation or environmental review process shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public. (Pub. Resources Code §21082.3 (c)(1)).

6. Discussion of Impacts to Tribal Cultural Resources in the Environmental Document: If a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document shall discuss both of the following:

- **a.** Whether the proposed project has a significant impact on an identified tribal cultural resource.
- **b.** Whether feasible alternatives or mitigation measures, including those measures that may be agreed to pursuant to Public Resources Code §21082.3, subdivision (a), avoid or substantially lessen the impact on the identified tribal cultural resource. (Pub. Resources Code §21082.3 (b)).

7. Conclusion of Consultation: Consultation with a tribe shall be considered concluded when either of the following occurs:

a. The parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or

b. A party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. (Pub. Resources Code §21080.3.2 (b)).

8. Recommending Mitigation Measures Agreed Upon in Consultation in the Environmental Document: Any mitigation measures agreed upon in the consultation conducted pursuant to Public Resources Code §21080.3.2 shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program, if determined to avoid or lessen the impact pursuant to Public Resources Code §21082.3, subdivision (b), paragraph 2, and shall be fully enforceable. (Pub. Resources Code §21082.3 (a)).

9. Required Consideration of Feasible Mitigation: If mitigation measures recommended by the staff of the lead agency as a result of the consultation process are not included in the environmental document or if there are no agreed upon mitigation measures at the conclusion of consultation, or if consultation does not occur, and if substantial evidence demonstrates that a project will cause a significant effect to a tribal cultural resource, the lead agency shall consider feasible mitigation pursuant to Public Resources Code §21084.3 (b). (Pub. Resources Code §21082.3 (e)).

10. Examples of Mitigation Measures That, If Feasible, May Be Considered to Avoid or Minimize Significant Adverse Impacts to Tribal Cultural Resources:

a. Avoidance and preservation of the resources in place, including, but not limited to:

i. Planning and construction to avoid the resources and protect the cultural and natural context.

ii. Planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.

b. Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:

i. Protecting the cultural character and integrity of the resource.

ii. Protecting the traditional use of the resource.

iii. Protecting the confidentiality of the resource.

c. Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.

d. Protecting the resource. (Pub. Resource Code §21084.3 (b)).

e. Please note that a federally recognized California Native American tribe or a non-federally recognized California Native American tribe that is on the contact list maintained by the NAHC to protect a California prehistoric, archaeological, cultural, spiritual, or ceremonial place may acquire and hold conservation easements if the conservation easement is voluntarily conveyed. (Civ. Code §815.3 (c)).

f. Please note that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated. (Pub. Resources Code §5097.991).

11. Prerequisites for Certifying an Environmental Impact Report or Adopting a Mitigated Negative Declaration or Negative Declaration with a Significant Impact on an Identified Tribal Cultural Resource: An Environmental Impact Report may not be certified, nor may a mitigated negative declaration or a negative declaration be adopted unless one of the following occurs:

a. The consultation process between the tribes and the lead agency has occurred as provided in Public Resources Code §21080.3.1 and §21080.3.2 and concluded pursuant to Public Resources Code §21080.3.2.

b. The tribe that requested consultation failed to provide comments to the lead agency or otherwise failed to engage in the consultation process.

c. The lead agency provided notice of the project to the tribe in compliance with Public Resources Code §21080.3.1 (d) and the tribe failed to request consultation within 30 days. (Pub. Resources Code §21082.3 (d)).

The NAHC's PowerPoint presentation titled, "Tribal Consultation Under AB 52: Requirements and Best Practices" may be found online at: http://nahc.ca.gov/wp-content/uploads/2015/10/AB52TribalConsultation_CalEPAPDF.pdf

SB 18

SB 18 applies to local governments and requires local governments to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space. (Gov. Code §65352.3). Local governments should consult the Governor's Office of Planning and Research's "Tribal Consultation Guidelines," which can be found online at: https://www.opr.ca.gov/docs/09_14_05_Updated_Guidelines_922.pdf.

Some of SB 18's provisions include:

1. Tribal Consultation: If a local government considers a proposal to adopt or amend a general plan or a specific plan, or to designate open space it is required to contact the appropriate tribes identified by the NAHC by requesting a "Tribal Consultation List." If a tribe, once contacted, requests consultation the local government must consult with the tribe on the plan proposal. **A tribe has 90 days from the date of receipt of notification to request consultation unless a shorter timeframe has been agreed to by the tribe.** (Gov. Code §65352.3 (a)(2)).
2. No Statutory Time Limit on SB 18 Tribal Consultation. There is no statutory time limit on SB 18 tribal consultation.
3. Confidentiality: Consistent with the guidelines developed and adopted by the Office of Planning and Research pursuant to Gov. Code §65040.2, the city or county shall protect the confidentiality of the information concerning the specific identity, location, character, and use of places, features and objects described in Public Resources Code §5097.9 and §5097.993 that are within the city's or county's jurisdiction. (Gov. Code §65352.3 (b)).
4. Conclusion of SB 18 Tribal Consultation: Consultation should be concluded at the point in which:
    a. The parties to the consultation come to a mutual agreement concerning the appropriate measures for preservation or mitigation; or
    b. Either the local government or the tribe, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached concerning the appropriate measures of preservation or mitigation. (Tribal Consultation Guidelines, Governor's Office of Planning and Research (2005) at p. 18).

Agencies should be aware that neither AB 52 nor SB 18 precludes agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52 and SB 18. For that reason, we urge you to continue to request Native American Tribal Contact Lists and "Sacred Lands File" searches from the NAHC. The request forms can be found online at: http://nahc.ca.gov/resources/forms/.

NAHC Recommendations for Cultural Resources Assessments

To adequately assess the existence and significance of tribal cultural resources and plan for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources, the NAHC recommends the following actions:

1. Contact the appropriate regional California Historical Research Information System (CHRIS) Center (https://ohp.parks.ca.gov/?page_id=30331) for an archaeological records search. The records search will determine:
    a. If part or all of the APE has been previously surveyed for cultural resources.
    b. If any known cultural resources have already been recorded on or adjacent to the APE.
    c. If the probability is low, moderate, or high that cultural resources are located in the APE.
    d. If a survey is required to determine whether previously unrecorded cultural resources are present.

2. If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
    a. The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum and not be made available for public disclosure.
    b. The final written report should be submitted within 3 months after work has been completed to the appropriate regional CHRIS center.

3. Contact the NAHC for:
   a. A Sacred Lands File search. Remember that tribes do not always record their sacred sites in the Sacred Lands File, nor are they required to do so. A Sacred Lands File search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with the geographic area of the project's APE.
   b. A Native American Tribal Consultation List of appropriate tribes for consultation concerning the project site and to assist in planning for avoidance, preservation in place, or, failing both, mitigation measures.

4. Remember that the lack of surface evidence of archaeological resources (including tribal cultural resources) does not preclude their subsurface existence.
   a. Lead agencies should include in their mitigation and monitoring reporting program plan provisions for the identification and evaluation of inadvertently discovered archaeological resources per Cal. Code Regs., tit. 14, §15064.5(f) (CEQA Guidelines §15064.5(f)). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources should monitor all ground-disturbing activities.
   b. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the disposition of recovered cultural items that are not burial associated in consultation with culturally affiliated Native Americans.
   c. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the treatment and disposition of inadvertently discovered Native American human remains. Health and Safety Code §7050.5, Public Resources Code §5097.98, and Cal. Code Regs., tit. 14, §15064.5, subdivisions (d) and (e) (CEQA Guidelines §15064.5, subds. (d) and (e)) address the processes to be followed in the event of an inadvertent discovery of any Native American human remains and associated grave goods in a location other than a dedicated cemetery.

If you have any questions or need additional information, please contact me at my email address: Cameron.Vela@nahc.ca.gov

Sincerely,

Cameron Vela

Cameron Vela
Cultural Resources Analyst

cc: State Clearinghouse

Kirsten Burrowes

From: Frances and Jim Owen <owen-family@comcast.net>
Sent: Thursday, August 31, 2023 10:27 AM
To: Public Comment@Cannabis
Subject: Intent to Draft EIR Mendocino County Attention: Angela

Follow Up Flag: Follow up
Flag Status: Flagged

Attention: Angela McIntire-Abbott
Re: State intent to draft EIRs for licensing of Commercial cannabis in Mendocino County.

We are local Redwood Valley residents of 44 years and are very concerned about the effects Commercial cannabis is having on our local community and we would like to see these addressed with an EIR prior to issuance of annual Commercial Cannabis Cultivation permits in Mendocino County.

First and foremost, given our drought years and global warming, we are extremely concerned about water usage. Many of us are on well water only and last summer we heard of at least 2 residential wells that went dry which had never gone dry before, in one case in 50 years!!. One is very close to big hoop house grows that went in and close to the Russian River that supplies water to many communities further south of this area. Thankfully, we had a wet winter and these wells recovered, but there is no guarantee this will not continue to happen. And wells are being drilled, they should not be allowed to drill wells. Existing vineyards use ponds and are sensitive to residential well water use and needs. Water is also trucked in: noise and roads are literally going to "pot." These big grows are being allowed too close to residential areas and are causing numerous problems, in addition to using too much water. Namely: Visual blight and visual obstruction, hoop houses and fences going up all over the place. Not good for our mental well being. We worry about wildlife. The plastic hoop houses are not good for the environment. They emit gasses and the plastics degrade. The smell restricts our usage of our own properties and people with allergies really suffer. Increased traffic and strangers in the area, many concerns over our safety. We could go on, but hopefully you're hearing from many other people throughout Mendocino County.

Do the darn EIRs please! We assume you'll publish your findings?

Sincerely,

Jim and Frances Owen
2230 Road E
Redwood Valley, CA 95470

Kirsten Burrowes

From: Covelo Son Grown, LLC <covelosongrown@gmail.com>
Sent: Thursday, August 24, 2023 9:05 AM
To: Public Comment@Cannabis
Subject: Mendocino County Annual License Morass

Follow Up Flag: Follow up
Flag Status: Flagged

To Whom It MAy Concern,

I am a 2nd generation, legacy, cannabis cultivator, born and raised in Covelo, CA. I have been seeking a license since Mendocino County re-issued the 9.31 program, which was one of the first attempts to regulate and allow the cultivation of cannabis in a "legal" manner. Before this most cultivation was done under the umbrella of Prop 215, the medical marijuana proposition, which really worked alot better than what we see now--except the County and State didn't get much tax revenue.

I am writing today to express my anger over the treatment that I and my fellow cultivators have received since the inception of Proposition 64. It is clear that the proposition was not well thought out and it is also clear that it was simply an underhanded way to replace Proposition 215, which many CA politicians did not agree with, since it deftly avoided the over taxation that is destroying the current model we see today.

My concern is that this long and protracted process of reaching a finalized version of a cultivation license/permit has exceeded the value that it brings to a farmer. Beside spending unreasonable amounts of money on legal support and unnecessary environmental consultations, most of us STILL do not have the license to grow what is clearly a plant, that clearly has no more impact on the environment than an onion, tomato or potato, yet is treated like its some type of hazardous waste.

My biggest complaint and concern however is that the rules for the scale of a cannabis business were made when the value of cannabis was much higher than it is now. Under State law a single Outdoor License can be up to 1 acre, a very reasonable scale for a small farmer. As an outdoor (full term) farmer, I agree with limits to indoor scale and greenhouse scale as both of those practices require significantly more infrastructure development and energy use than does an outdoor farm. My concern now, after years of waiting and expense that has diverted money from my farm to the pockets of the State, County and Consultants is that the scale we are locked into is not sufficient to make up for the dramatic drop in value of cannabis products (all types) and the total expense of trying to become legal in the first place.

This problem is not just impacting the cultivator as well. It impacts the citizens of our County because the primary economic driver in the rural areas of Mendocino are completely linked to the outcome (or lack thereof) of this streamlining process. I would say that the time has come to reward the cultivators who are still footing the bill for this process by allowing them to scale up to 1 acre and then providing them with the Annual License that should have been much less expensive and troublesome to receive in the first place.
Sincerely,

Rio Cardone
Owner Covelo Son Grown, LLC

Kirsten Burrowes

From: Ronald Ford <kannford09@comcast.net>
Sent: Saturday, August 19, 2023 12:48 PM
To: Public Comment@Cannabis
Cc: ronaldford
Subject: Cannabis Proliferation

Follow Up Flag: Follow up
Flag Status: Flagged

C/O Angela McIntire-Abbott

Department Leaders,

I have lived in Redwood Valley, Mendocino County, except for college and military service, for the last 85 years. I am very concerned about agriculture and forestry resources, hydrology and water quality, land use and planning, tribal and cultural resources, and availability of water per se. Please help with EIR's

Sincerely, Ronald K. Ford

From: stephen <tsminin@gmail.com>
Sent: Saturday, August 19, 2023 11:19 AM
To: Public Comment@Cannabis
Subject: EIR/CEQA Review

[EXTERNAL]: tsminin@gmail.com

CAUTION: THIS EMAIL ORIGINATED OUTSIDE THE DEPARTMENT OF CANNABIS CONTROL!
DO NOT: click links or open attachments unless you know the content is safe.
NEVER: provide credentials on websites via a clicked link in an Email.

Hello.

As a cultivator in Mendocino County holding two Provisional Adult Specialty Outdoor Licenses (CCL 18-0002141, CCL 20-0001824) I was told by the county to complete an EIR/CEQA study on my property. I did so at the cost of over $20,000. I've submitted all information to the county. My question is, will the new DCC guidelines force me to complete a new study or will DCC use the study (for my purposes) that I've already submitted to Mendocino County?
Thank you for your reply.
Respecfully,
Stephen Cato
530-713-4568
tsminin@gmail.com

Monday, August 28th, 2023

From: Willits Environmental Center
630 South Main Street
Willits CA 95490
wece@sbcglobal.net
707-459-2643

To: Department of Cannabis Control c/o Angela McIntire-Abbott
2920 Kilgore Rd.
Rancho Cordova, Ca 95670
info@cannabis.ca.gov
or
publiccomment@cannabis.ca.gov

Re: Comments/Question Regarding the Notice of Preparation and Public Scoping For A Draft Environmental Impact Report For The Licensing of Commercial Cannabis Cultivation In Mendocino County Project

Dear Ms. McIntire-Abbott;

On behalf of the Willits Environmental Center I am submitting the following questions/comments on the above referenced Project:

1. Has the State done "Projects" in other Counties similar to what is being proposed in Mendocino County, or is this "Project" unique to Mendocino County?

2. On what basis will the DCC determine if there is the potential for significant environmental impacts from granting a State license to an individual Mendocino County cannabis cultivation applicant?

3. What will come first - the granting of a County permit (or license) to cultivate cannabis, or the DCC's granting a State license to a Mendocino County cannabis cultivation applicant? Which licensing entity will act first? Will the issuance of one license be dependent on the prior issuance of the other?

4. How will the DCC evaluate cumulative impacts of current and future growers?

5. How will the DCC establish a "baseline" condition in the County? Will current conditions of the EIR CEQA "checklist" categories be assessed throughout the areas of the County affected by cannabis cultivation? Wouldn't such an undertaking require at least one full year to capture existing plant, fish and wildlife conditions, and the potential impacts of past present and future cannabis operations on these resources?

6. How will the DCC incorporate Mendocino County's existing cannabis cultivation and land use statutes into its assessment. Will the DCC assess the success and/or failures Mendocino County's enforcement of its existing cannabis cultivation statutes as part of the DEIR?

7.What entity will be responsible for ground-truthing individual cultivation sites, and how will that be done?

8. What caused the DCC to take on this project? Hasn't the State already done and EIR for the State's cannabis cultivation licensing program? Are there particular areas of impacts that the State feels Mendocino County has failed to consider in evaluating and/or issuing County permits, despite the County's approved IS and MND for its existing cannabis cultivation ordinance?

9. Was Mendocino County simply unwilling, or unable, to determine whether or not applicants would individually or cumulatively harm the environment, and therefore the State is stepping in in order to get current and future cannabis cultivators licensed, in business, and paying taxes?

10. Has this situation occurred in any other County? If so, please refer me to the DCC's other county's EIR documents.

11. Why will the "Project" cost $5 million?

12. Will this State/DCC "Project" process and ultimate issuing of State licenses to Mendocino County growers, present and future, in any way alter the County's current statutes regulating cannabis cultivation and associated activities?

Thank you very much for your response to these questions. We look forward to a better understanding of this process as it affects the natural and human environment of Mendocino County, and to our continuing involvement in its unfolding.

Sincerely
Ellen Drell, for the Willits Environmental Center, wece@sbcglobal.net
707-459-2643