From:	Courtney Taylor
To:	Nelson, Bob; Williams, Das; Hart, Gregg; Hartmann, Joan; Lavagnino, Steve
Cc:	sbcob; Kim, Callie; Marshall Miller; John Haan; kpoloncarz@cov.com; Kimberly McCormick; mstrange mfsair.com; Jim McCord
Subject:	Summary Letter: Appeal of Canna Rios LLC - Outdoor Cannabis Cultivation (19LUP-00000-00116)
Date:	Tuesday, December 7, 2021 10:12:06 AM
Attachments:	Board 12-7-2021 Ltr RE Canna Rios Appeal.pdf

Dear Supervisors,

My name is Courtney Taylor, and I am co-counsel with John Haan Jr. and others on the appeal of the above-referenced cannabis Land Use Permit. Our appeal is being heard by your Board on December 14th.

We have raised various substantive legal issues throughout the appeal process, both at the Planning Commission hearing and with your Board in our appeal letter and subsequent memos. We recognize the complexity of these legal issues and are providing the attached letter to summarize each issue, along with six (6) memos to provide further detail for each.

I have copied the Clerk of the Board and Callie Kim, County Counsel, on this email as well. Please include this letter and attachments in the appeal record.

We look forward to discussing the appeal with each of you later this week during our site visits at Bien Nacido Vineyards. My client appreciates you each taking the time to meet with us to review our concerns.

Thank you,
Courtney

Courtney E. Taylor
6465 Nursery Way, San Luis Obispo, CA 93405
p: 805.316.1278 | ***c:*** 805.234.2706 | ***w:*** courtneyetaylor.com
Legal Counsel to the **Alcohol Beverage Industry**

ROGERS, SHEFFIELD & CAMPBELL, LLP

LAW OFFICE OF
COURTNEY E. TAYLOR
A PROFESSIONAL CORPORATION

VIA EMAIL

December 7, 2021

Santa Barbara County Board of Supervisors
123 E. Anapamu Street
Santa Barbara, California 93101

RE: Summary of Appeal Issues / Canna Rios LLC - Outdoor Cannabis Cultivation 19LUP-00000-00116)

Chair Nelson and Honorable Supervisors:

Our offices represent the Miller Family, West Bay Company, LLC, RTV Winery, LLC, and Bien Nacido Vineyards, L.P. (collectively referred to as "**Appellant**"). This letter is intended to summarize the various appeal issues we have raised in our appeal with additional supporting evidence. During the hearing on December 14, 2021, we will address the following issues before your Board:

1. Unpermitted Surface Water Diversion for Cannabis[1]
2. Failure to Analyze Project Air Quality Impacts[2]
3. Permits are Required for Compost and Waste Areas[3]
4. Failure to Properly Calculate Project Emissions in Transportation Demand Management Plan[4]
5. Odor Control is Required for Project Trimming Activities[5]
6. Unpermitted Berm Construction[6]

The Project is located in a uniquely sensitive part of the Santa Maria Valley. The Project parcel is surrounded on two of its three sides by the Cuyama River to the north and the confluence of the Santa Maria River and Sisquoc River to the west. Appellant's ranch is located directly east. As a result, the Project impacts are extremely unique and site-specific which require detailed review and mitigation prior to approval of the proposed Project. Further, many of these impacts will directly affect Appellant's business, which is unprecedented in light of the historic and continuing importance of the Bien Nacido Vineyards to Santa Barbara County agriculture and wine industry.

---

[1] See Memorandum from Dr. Jim McCord of Lynker, dated December 7, 2021, attached hereto as Exhibit 1.

[2] See Memorandum from Kevin Poloncarz of Covington & Burling LLP, dated September 23, 2021, attached hereto as Exhibit 2.

[3] See Memorandum from Kim McCormick, Esq. of Law Office of Kim McCormick, PLLC, dated December 3, 2021, attached hereto as Exhibit 3, and Memorandum from Marianne Strange of M.F. Strange & Associates, Inc., dated December 3, 2021, attached hereto as Exhibit 4.

[4] See Memorandum from Marianne Strange of M.F. Strange & Associates, Inc., dated December 3, 2021, attached hereto as Exhibit 4

[5] See Letter from John Haan, Jr., Esq. of Rogers, Sheffield & Campbell, LLP, dated November 24, 2021, attached hereto as Exhibit 5.

[6] See Memorandum from Kim McCormick, Esq. of Law Office of Kim McCormick, PLLC, dated December 3, 2021, attached hereto as Exhibit 6.

There is nothing in the County's Programmatic EIR that could have contemplated this set of facts: a uniquely sensitive site on the San Luis Obispo County line with proximity to three rivers, upwind from three permitted stationary sources, and with a historic vineyard directly adjacent without any intervening topography. In light of these facts, the analysis currently undertaken by the County to support Project approval is wholly inadequate and fails to comply with numerous state and federal laws. Needless to say, the Project cannot be approved as proposed without the County addressing the significant issues set forth in this letter, including completing further environmental review as is plainly required under CEQA and further review of the Project's compliance with all applicable laws.

APPEAL SUMMARY

1. Project Proposes Use of Surface Water for Cannabis Irrigation in Violation of State Water Board Regulations – See Exhibit 1

The Project cannot be approved without a finding, based on substantial evidence in the record, that "adequate public or private services and resources (e.g., water, sewer, roads) are available to serve the proposed development." There is substantial evidence supporting a conclusion that there is not adequate water to serve the proposed Project, and no evidence showing that the Project either has or can secure the State Water Resources Control Board (SWRCB) authorization that is plainly needed for this cannabis cultivation project. Under these circumstances, Board approval of the Project would constitute a prejudicial abuse of discretion.

For background, streams and rivers can have a subterranean flow of water as well as its visible surface flow. If a stream or river has a relatively impermeable bed and banks containing its alluvial gravels and floodplains, both of these flows are considered surface water. Many of these larger, self-contained subsurface flows are well-studied, and are classified as a 'known and delineated subsurface stream or channel.' Surface waters in California are under the jurisdiction of the State Water Resources Control Board and not any other groundwater agency.

The SWRCB recognizes the potential for cannabis operations to negatively impact riparian environments and their inhabitants. Thus, the SWRCB has established strict policies regulating diversion and use of surface water for cultivating commercial cannabis,. On October 17, 2017, the SWRCB adopted the Cannabis Cultivation Policy – Principles and Guidelines for Cannabis Cultivation which establishes rules and regulations regarding water issues related to cannabis cultivation. On February 5, 2019, the SWRCB adopted proposed updates to the Policy.

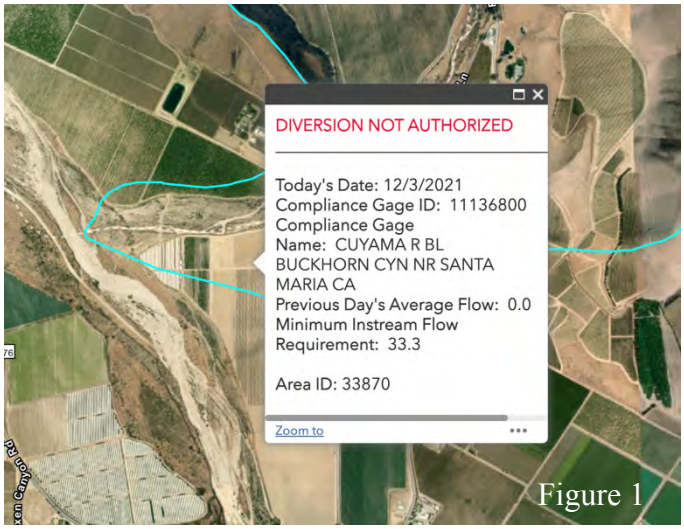


Figure 1

The SWRCB has adopted forbearance limitations to diversions based on both calendar dates and instream flow gages calculating riparian water flow. The SWRCB website summarizes these regulations, in part, as follows: "Cannabis

cultivators shall not divert surface water for cannabis cultivation activities at any time from **April 1 through October 31** of each calendar year."

In order for commercial cannabis growers to comply with these instream flow and calendar date forbearances regarding surface water, the SWRCB has developed an online interactive GIS map. See Figure 1 above. A cannabis grower must check this map daily in order to determine whether they are allowed to divert surface water for cannabis irrigation for that day.

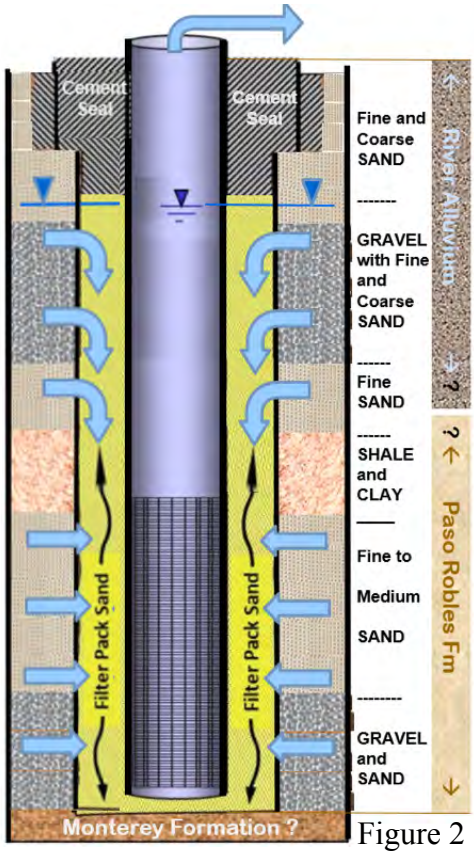


Figure 2

The Project applicant submitted a letter outlining the irrigation well completion strategy for the well proposed to irrigate all cannabis for the Project. The well was designed to draw water from the Paso Robles formation below the low permeability shale and clay aquitard layer. The intent was to avoid drawing water from the shallow alluvial aquifer above, which is groundwater connected to surface water and thus subject to water rights administration by the State Water Resources Control Board and its prohibition on seasonal diversions.

Based Appellant's expert's review of the geologic maps for the Project vicinity area (e.g., Dibblee, 1994; Cleath and Associates, 2004) and the base map for State Water Boards eWRIMS online water rights mapping tool, it appears that the well proposed for the Project (marked as "Pump #1 on site plans) is located within Sisquoc River alluvium. Based on the location of the well within the Sisquoc River alluvium, the descriptions of the local hydrogeologic setting, and the well completion report and driller's log (Well 0001567) it is presumed that this well produces water that meets the criteria of connected groundwater that is administered conjunctively with surface water by the State Water Resources Control Board.

With respect to the well construction, the intended hydraulic isolation afforded by the shale-clay layer is essentially short-circuited by the annular sand pack in the well. In other words, as shown in Figure 2 above, the highly permeable saturated alluvium layers above the shale-clay layers are hydraulically connected to the deeper well intake screen via the well filter pack sand. One can view it like a vertical pipe, allowing shallow connected water to cascade into the wellbore and get pumped to the surface for cannabis irrigation.

Given these conditions, operation of the Project well #1 as a source for cannabis irrigation supplies will be constrained by SWRCB rules which prohibit diversion of surface water for cannabis cultivation activities between April 1 through October 31 of each calendar year. Without the ability to divert surface water during these growing months, the Project will not have adequate water to serve the proposed Project and the Board cannot make this required Project finding.

2. County Has Failed to Analyze Project-Specific Air Quality Impacts – See Exhibit 2

Further environmental review of the Project's air quality impacts is necessary and the failure to conduct such analysis in association with the Project is inconsistent with CEQA and unlawful. While the County completed a "checklist" concerning the Project pursuant to Section 15168 of the CEQA Guidelines, that checklist fails to examine the Project's foreseeable environmental impacts, specifically its potential to contribute to significant air quality and climate change impacts. Instead, the checklist refers back to the PEIR as an adequate examination into the Project's potential impacts. This conclusion overlooks gaps in the PEIR itself, as well as new information and changed circumstances since the PEIR was certified.

The PEIR only considered the impact of combustion-related VOCs from mobile sources and agricultural equipment on nonattainment with state and federal ozone standards and only within Santa Barbara County; the only air quality impacts considered in relation to biogenic VOCs were odors and, during the subsequent appeal, "terpene taint." Yet since the time when the PEIR was certified, the following new information of substantial importance that was not available at the time of the PEIR's certification has become available that shows that the Project's air quality impacts will be significantly greater and more severe than considered by the PEIR:

1. New scientific studies have been published indicating that biogenic VOC emissions from commercial cannabis cultivation contribute to ozone and other air pollution.
2. The portion of San Luis Obispo County lying literally at the northern boundary of the Project site has been designated nonattainment for the more stringent 2015 National Ambient Air Quality Standard ("NAAQS") for ozone under the Clean Air Act.
3. California Air Resources Board ("CARB") recently downgraded Santa Barbara County's designation for the state ozone standard from "attainment" to "nonattainment."

Technical analyses supporting EPA's ozone designations illustrate how emissions occurring within the vicinity of the Project site could have impacts on nonattainment as far downwind as Merced or Bakersfield, which are designated as extreme ozone nonattainment areas and experience some of the worst air pollution in the nation. This new information and the changes in ozone designations demand further environmental review to understand the role that biogenic VOCs from the Project will have on ozone pollution and on violations of state and federal ozone standards, both within Santa Barbara County and elsewhere. The PEIR fails to give any consideration to the role that biogenic VOCs from cannabis cultivation may have on ozone pollution levels in either Santa Barbara County or San Luis Obispo County, which is quite literally at the Project's property line. The Project-specific checklist also fails to include any such discussion.

The County's Staff Report at the May 5, 2021 Planning Commission hearing for the Project confirms that biogenic VOCs resulting from cannabis cultivation were considered by the County *only as a potential cause of terpene taint* (the worry that terpenes from cannabis will impact the flavor of wine grapes). But the response mischaracterizes the PEIR's analysis and paints with too broad of a brush in arguing that "VOCs and terpenes are discussed in the PEIR and were considered as part of the analysis of air quality impacts." As described above, the PEIR only analyzed the ozone impacts associated with VOC emissions from combustion of fuels in mobile sources and agricultural equipment; it completely failed to even describe the biogenic VOCs emitted by cannabis plants or to consider how those emissions could

contribute to nonattainment with state or federal ozone standards in Santa Barbara County, San Luis Obispo County, or elsewhere.

Figure 3

Further, the Project is located directly north of a CalPortland (concrete and asphalt recycling facility) and Hanson Aggregates facilities, both permitted stationary sources permitted to emit NOx and Particulate Matter (see Figure 3 to the left). High concentrations of VOCs emitted from cannabis cultivation at the Project, when combined with these permitted emissions sources downwind could be a detriment to human health and adjacent sensitive receptors. The Blochman School is directly downwind of these uses. Breathing of fine particulate matter (particularly inhalable PM10 and PM2.5) can lead to a wide variety of cardiovascular and respiratory health effects. Further, the County is designated as nonattainment for the State PM10 standard.

In short, with this new information available, unless and until the County conducts additional review to consider how the Project's emissions of biogenic VOCs will contribute to violation of state and federal ozone standards in Santa Barbara County and the federal nonattainment area immediately adjacent to the Project site, the requirements of CEQA have not been met and the Project's approval is unlawful.

3. Project Fails to Analyze the Compost and Waste Area Impacts on Federally Protected Steelhead and Compliance with Applicable Compost Regulations – See Exhibits 3 & 4

Cannabis Waste Discharge Requirements

The Project proposes a 0.76-acre waste and compost storage area located approximately 200 feet from the Santa Maria River. There is absolutely no description of how this area will be constructed or managed, if any measures will be taken to ensure that waste and compost runoff does not flow into the Santa Maria River, or any explanation or analysis of potential impacts of the compost and waste areas to steelhead in the Santa Maria River.

Steelhead use the Santa Maria River, which are listed as endangered under the federal Endangered Species Act, 16 U.S.C. Section 1531 et seq. (ESA). See 62 Fed. Reg. 43937 (August 18, 1997); 71 Fed. Reg. 833 (January 5, 2006); and 79 Fed. Reg. 20802 (April 14, 2014). The Santa Maria River is designated under the ESA as critical habitat for steelhead, so it is essential that the County analyze the potential for material

from the proposed compost and waste storage area to reach the Santa Maria River and/or cause harm to steelhead.

Condition 16 for the Project requires the following: "[t]he applicant shall *demonstrate compliance* with the State Water Resource Control Board's comprehensive Cannabis Cultivation Policy…*prior to approval of the Land Use Permit*." The Project has not even attempted to "demonstrate" compliance with the Water Board's requirements or mitigation of the impacts to all federal and state protected species, including steelhead in the Santa Maria River. Without this analysis, the County has not determined whether the Project is in compliance with the Cannabis General Order or the County's own mitigation measure MM-HWR-1.

General Waste Discharge Requirements for Composting Operations

Further, in addition to the Cannabis Waste Discharge Requirements, the Regional Water Quality Control Board, Central Coast Region, adopted General Waste Discharge Requirements for Composting Operations (General Compost Order). The Order requires compost operators to implement certain measures to protect water quality.

The Compost General Order describes composting activities that produce compost for use on site, including agricultural sites, as conditionally exempt provided four criteria are met. There is nothing in the record to determine if the Project's for the proposed waste and compost storage area is exempt and if not, if the General Compost Order requirements have been met.

If the proposed onsite compost and waste storage area is not exempt from the General Compost Order, then agricultural composting operations may still be required to obtain coverage under other permits such as stormwater permits or agriculture-specific waste discharge requirements. There is no discussion of what other permits, if any, are required for the Project's proposed waste and compost storage area. If the proposed Project is exempt from these requirements under other provisions, and if specific WDRs have been issued for the Project that include the proposed waste and storage area, that also should be explained.

Clean Water Act

The federal Clean Water Act (CWA) prohibits the discharge of pollutants into "navigable waters from any point source." 33 U.S.C. 1362(12). A "point source" is any discernible, confined and discrete conveyance . . . from which pollutants are or may be discharged." 1362(14). If a party does not obtain a National Pollutant Discharge Elimination System (NPDES) permit exempting them from this prohibition, then the party violates the CWA when it discharges a pollutant to navigable waters from a point source.

Here, the compost and waste storage areas are discernible and confined areas that can be identified as the source of any pollution that runs into the adjacent navigable waters of the Santa Maria River and therefore is a point source. The discharge of the pollutant does not have to be discharged directly from the point source into the navigable water – it is considered a discharge if it is traceable from the point source to the navigable water. Without any information regarding management of the compost and waste areas, and the functioning of the storage areas, it is not possible to determine how the Project will operate and whether discharges requiring a NPDES permit will occur.

Without any plans or description of the proposed waste and compost storage area, the County cannot determine (1) whether the Project has met the Cannabis Waste Discharge Requirements as required by the County's mitigation measure MM-HWR-1, (2) whether or to what extent the General Compost Order requirements apply to the compost storage area, and if not, what evidence supports an exemption, or (3) whether a NPDES permit is required under the Clean Water Act.

Santa Barbara County Air Pollution Control District (APCD) Rule 202

In addition to species and water quality impacts, the composting of cannabis green-waste on site will generate 3.54 tons per year of volatile organic compound (VOC) emissions along with 0.04 tons per year of ammonia (NH3) emissions. Composting is considered a support facility to the Projects agricultural operations and is subject to Santa Barbara County Air Pollution Control District (SBC ACPCD) permitting requirements.

SBC APCD Rules provide certain exemptions for agricultural operations, however, composting is not exempt from Rules 102 Definitions or 202.D.3 Exemptions to Rule 102 as its the estimated emissions exceed one (1) ton of VOCs each calendar year. Thus, the composting operation is required to obtain an Authority to Construct and a permit to Operate per SBC ACPD Rule 202.D.7.

4. Project Transportation Demand Management Plan Fails to Consider Emissions from Required Trips for Cannabis Transport Offsite – See Exhibit 4

The Project's Transportation Demand Management Plan (TDMP) fails to consider emissions from the following trips generated by the Project: transportation of harvested material offsite, and hauling of green-waste offsite.

Harvest Truck Trips

The Project proposes that harvested cannabis is transported to a processing facility in King City. Based on typical harvest boxes that are used for other cannabis growing operations and the average growing density of cannabis in outdoor cultivation (2,000 plants per acre), it is estimated that the Project will generate 300 round trips (into and out of the Project site) per harvest. This is 600 one-way trips per harvest and 1,200 one-way trips per year, which far exceeds the two (2) trips per day in the TDMP.

Further, when 600 one-way harvest truck trips during a single harvest are combined with the 50 daily one-way employee trips during harvest set forth in the TDMP, the CEQA Significance project screening threshold of 110 average daily trips could be exceeded if the harvest were to be accelerated.

Waste Haul Trips

It has been estimated that the Project will yield as much as 184,800 pounds (337 cubic yards) of green-waste per year due to cannabis cultivation operations. The removal of this material from the Project site would require nine (9) large (40 cubic yard) waste roll-off bins per year. This assumes that no additional materials are added to the cannabis green-waste to assist with the composting (e.g. food wastes or manures). The traffic and emissions generated from these activities are not considered in the Project's TDMP.

5. Odor Control is Required by the County Land Use & Development Code for Project Trimming Activities – See Exhibit 5

The Project also fails to meet the requirements of LUDC Section 35.42.075.D.1.o, which requires that the drying, curing, and/or trimming of harvested cannabis shall either (1) be located within an enclosed structure which utilizes best available control technology, or (2) include techniques and/or equipment that shall achieve an equivalent or greater level of odor control as could be achieved using an enclosed structure which utilizes best available control technology. The Project's activities are neither contained within an enclosed structure, nor using equipment or technology that achieves an equivalent or greater level of odor control as could be achieved using an enclosed structure, which utilizes best available control technology (or "BACT").

There is evidence that even the Applicant is unclear whether their activities constitute "trimming" under the LUDC. The original Project Description included "trimming" of cannabis on-site in the outdoor cannabis areas. The Staff Report at the Planning Commission hearing on May 5, 2021, however, removed this reference but did not indicate or state that the removal of references to trimming on-site was a modification made by the Applicant prior to the hearing.[7] Other changes to the Project were specifically identified, but this was not.

The Project site plans state there will be "No drying, trimming, or finish packaging onsite…" with other references to activities which state that harvested cannabis will be "boxed and shipped away same day…" These statements are incorrect, as Applicant intends to engage in processing by harvesting and trimming cannabis in the field and packing cannabis onsite. The LUDC specifically defines "processing" for cannabis as "All activities associated with drying, curing, trimming, storing, packaging, and labeling of nonmanufactured cannabis products." The activities proposed by the Applicant fall within the County's own definition of "processing" and the attendant odor control methods in LUDC Section 35.42.075.D.1.o are required upon commencement of any Project activities.

6. Project Parcel has a Continuing Violation of the Rivers and Harbors Act Due to Unpermitted Berm Construction – See Exhibit 6

A northern portion of Project site includes an area that appears to have been created by the construction of earthen berms that resulted in the rerouting of the Cuyama River. In light of historical flooding that has occurred along the Cuyama River in the Project area, the construction of these berms and rerouting of the Cuyama River could result in significant damage to the Bien Nacido Vineyards.

The Project cannot move forward as proposed until the County has confirmed that the berm construction and rerouting of the Cuyama River was done in accordance and compliance with all applicable permit requirements, including permits required under the federal Rivers and Harbors Act and Clean Water Act. Regardless of the Project's statements regarding the history or timing of the construction of the berm, each

[7] It appears the Project will create substantial waste as it will require a composting area covering .76 acres (113,705 sq ft). Given the size of the composting area, it is unfathomable that no "trimming/processing" will be occurring on-site as the need for a composting area of this size is a result of trimming/processing that will be occurring as part of the Project. If there was no on-site trimming/processing occurring, there would be no need for an on-site composting area, as the entire cannabis plant would be removed and taken off-site for processing (thereby creating waste at the processing facility and not at the Project site).

week's continuance of any such obstruction is deemed a separate offense by law notwithstanding who or when the berm was constructed. 33 U.S.C. 403a.

Figure 4

During a major El Niño event in 1998, flood control releases from Twitchell Dam resulted in thousands of cubic yards of silt filling in areas along the Cuyama River downstream. In some places, the riverbed was filled to the top of the banks with silt. Four affected property owners sought permits from the U.S. Army Corps of Engineers (USACE) to restore the Cuyama River beginning at the property boundary between Bien Nacido and Beringer Wine Estates, about 1.5 miles upstream from the unpermitted berm. On April 1, 1998 the restoration work was approved by USACE, which included four (4) discrete sites for such work (see Figure 4 to the left). Maps provided by USACE depicting this approved work do not show the features now existing on the Maldonado property where the Project is proposed, including the redirected river course and the berm area now being used as a river crossing and equipment and tractor storage.

The Rivers and Harbors Act, 33 U.S.C. 401 et seq., prohibits the construction of any bridge, causeway, dam or dike or any other unauthorized obstruction over any navigable water of the United States unless either approved by the Coast Guard or the USACE. The Cuyama River is a navigable water of the United States, and thus subject to this prohibition. All excavation or fill to modify or alter the course, location, condition or capacity of the Cuyama River must be authorized by USACE prior to the beginning of the work. 33 U.S.C. 403. The continuance of an unauthorized obstruction constitutes an offense without regard to when or who constructed such obstruction or modification of the river. 33 U.S.C. 403a.

There is no evidence that this work was ever permitted by USACE. A Freedom of Information Act (FOIA) request dated June 16, 2021, requesting information regarding impoundment at and resulting diversion of the Cuyama River from 1964 to the present, resulted in a finding of no responsive documents by the USACE. Further, the work permitted to restore the blown out areas of the Cuyama River did not include restoration of the berm. Accordingly, it appears the berm and the access road were created in violation of the Act and remain in continuing violation of the Act.

The County cannot proceed with approval of any permits on the Project parcel until this violation is remedied in coordination with USACE. The Applicant's reliance of a Section 1603 letter received for the Project is not relevant, as the land as it sits today is in violation of the Rivers and Harbors Act and must be investigated.

CONCLUSION

After investing millions in its estate vineyard and tasting room, and building up an impeccable reputation that as significantly bolstered the Santa Barbara County wine industry, Appellant faces what could be (and is perceived by many to be) a threat to their existence due to the extent and severity of the land use incompatibility of cannabis with adjacent agriculture. As discussed above, the Project is located in a uniquely sensitive part of the Santa Maria Valley and faces unique challenges with respect to its impacts on the surrounding areas that were not considered in the PEIR for the Cannabis Ordinance.

As is presented herein, this Project may not be approved as proposed as there is serious doubt the County has the substantial evidence required to make the legally required findings to approve the Project. As such, the Board's approval of this Project would violate CEQA, numerous State and Federal statutes that protect our air and natural resources, and would represent an abdication of the County's responsibility to protect the health, safety, and welfare of the Santa Maria Valley and adjacent areas. Accordingly, Appellant urges the Board to uphold the appeal and deny the Project.

Respectfully submitted,

LAW OFFICE OF COURTNEY E. TAYLOR, APC

Courtney E. Taylor

ROGERS, SHEFFIELD & CAMPBELL, LLP

John H. Haan, Jr.

Exhibits

Exhibit 1: Memorandum from Dr. Jim McCord of Lynker, dated December 7, 2021

Exhibit 2: Memorandum from Kevin Poloncarz of Covington & Burling LLP, dated September 23, 2021

Exhibit 3: Memorandum from Kim McCormick, Esq. of Law Office of Kim McCormick, PLLC, dated December 3, 2021

Exhibit 4: Memorandum from Marianne Strange of M.F. Strange & Associates, Inc., dated December 3, 2021

Exhibit 5: Letter from John Haan, Jr., Esq. of Rogers, Sheffield & Campbell, LLP, dated November 24, 2021

Exhibit 6: Memorandum from Kim McCormick, Esq. of Law Office of Kim McCormick, PLLC, dated December 3, 2021

EXHIBIT 1

07 December 2021

Law Office of Courtney Taylor, APC
Attn: Courtney Taylor
6465 Nursery Way
San Luis Obispo, California 93405

RE: Hydrogeologic Evaluation of Irrigation Water Supplies for Canna Rios Cannabis Production Project, 3205 White Rock Lane, Santa Maria, California 93454; APN 129-040-010

Dear Courtney:

Pursuant to your request, I am pleased to submit this technical review of hydrology and hydrogeology in the Santa Maria River basin in the vicinity of the Canna Rios LLC (Canna Rios) proposed cannabis production project, located at the northern limit of the basin near Garey, California. This technical memo specifically focuses on review of the hydrogeologic data and information for the project and surrounding area, and information and data provided by the applicant related to the project. Particular focuses included estimating impacts to surface flows in the nearby Sisquoc River (just upstream from its merging with the Cuyama River, forming the Santa Maria River at the confluence) and potential interference with other existing groundwater users in the area (e.g., lowering of groundwater levels at neighboring properties).

Summary of Findings

Based on the review and analyses, four over-arching findings are identified related to the hydrogeology in the project vicinity and the source of groundwater pumped from the Canna Rios applicant wells:

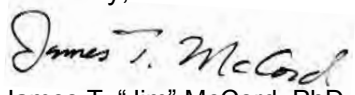
1. Based on our review of the geologic maps for the study area (e.g., Dibblee, 1994; Cleath and Associates, 2004) and the base map for State Water Boards eWRIMS online water rights mapping tool, it appears that the recently installed Canna Rios well is located within Sisquoc River alluvium.
2. Based on the location of the well within the Sisquoc River alluvium, the descriptions of the local hydrogeologic setting, and the well completion report and driller's log, Canna Rios Well 0001567 is presumed to produce groundwater that meets the criteria of connected groundwater that is administered conjunctively with surface water by the State Water Resources Control Board (SWRCB).

3. Given these conditions, operation of the new Canna Rios well as a source for cannabis irrigation supplies will be constrained by SWRCB rules related to time periods when diversions to cannabis production projects are allowed to occur.

Technical details on the data acquisition, review, compilation and applied analyses that underlie these findings are provided in the attached technical report.

We appreciate the opportunity to undertake this analysis and present our findings and the attached report. I hope it meets your current needs. Please let me know if you have any follow-up questions or need additional information.

Sincerely,



James T. “Jim” McCord, PhD, PE
Principal Water Resource Engineer / Groundwater Lead
Lynker Technologies, LLC | +1-505-261-0837 (US) +51-986-061-266 (Peru) | jtmccord@lynker.com

Table of Contents

Figures

1. INTRODUCTION

Canna Rios LLC (Canna Rios) have proposed an outdoor cannabis production project, whose location and overall facilities layout are shown in **Figure 1**. As proposed, all irrigation water supplies for the from the existing groundwater extraction wells located as shown (**Fig. 1**). Santa Barbara County's Final Environmental Impact Report (EIR) for the Cannabis Land Use Ordinance and Licensing Program (PEIR) requires the positive demonstration of water supply in accordance with State and local policies. Which State or local regulation that would be applicable to a particular cannabis project depends on hydrogeologic formation from which irrigation water supplies would be drawn, and where the project is located with respect to surface water streams and groundwater basins as defined by the California Department of Water Resources (DWR, 2018, Bulletin 118). Information developed in this report is important for the Santa Barbara County Land Use and Planning (henceforth "the County" for simplicity) Commission as the consider the Canna Rios application.

This technical report provides a review of hydrology and hydrogeology in the Santa Maria River basin in the vicinity of the Canna Rios project. This review and associated analyses specifically focus on the hydrogeologic data and information for the project and surrounding area. The subject information and data were obtained from documents submitted to the county by the applicant related to the project, which was supplemented by a search of the public records and literature. Particular focuses in our analyses have included:

- estimating impacts to surface flows in the nearby Sisquoc River (just upstream from its merging with the Cuyama River, forming the Santa Maria River at the confluence) and
- estimating potential interference with other existing groundwater users in the area (e.g., lowering of groundwater levels at neighboring properties).

Section 2 below provides a compilation and synthesis of the hydrogeologic data and well logs to develop an understanding of the hydrogeologic setting of the area that will be impacted by pumping of the Canna Rios wells to meet crop irrigation demands. Based on the hydrogeologic data, a hydrogeologic conceptual model of stream - aquifer interactions is developed for the Canna Rios wells and described in **Section 3**. Then a simplified model developed by the US Geological Survey is applied to estimate the range of likely impacts to surface water flows in the nearby Sisquoc and Cuyama Rivers and connected alluvial aquifers.

2. HYDROGEOLOGIC SETTING OF CANNA RIOS PROPERTY

The source of groundwater produced by the Canna Rios well pumping and the impact of that pumping on groundwater conditions and streamflow losses in the nearby Sisquoc River alluvium depend on the hydrogeologic setting. **Figure 1** shows the project location in northern Santa Barbara county, and

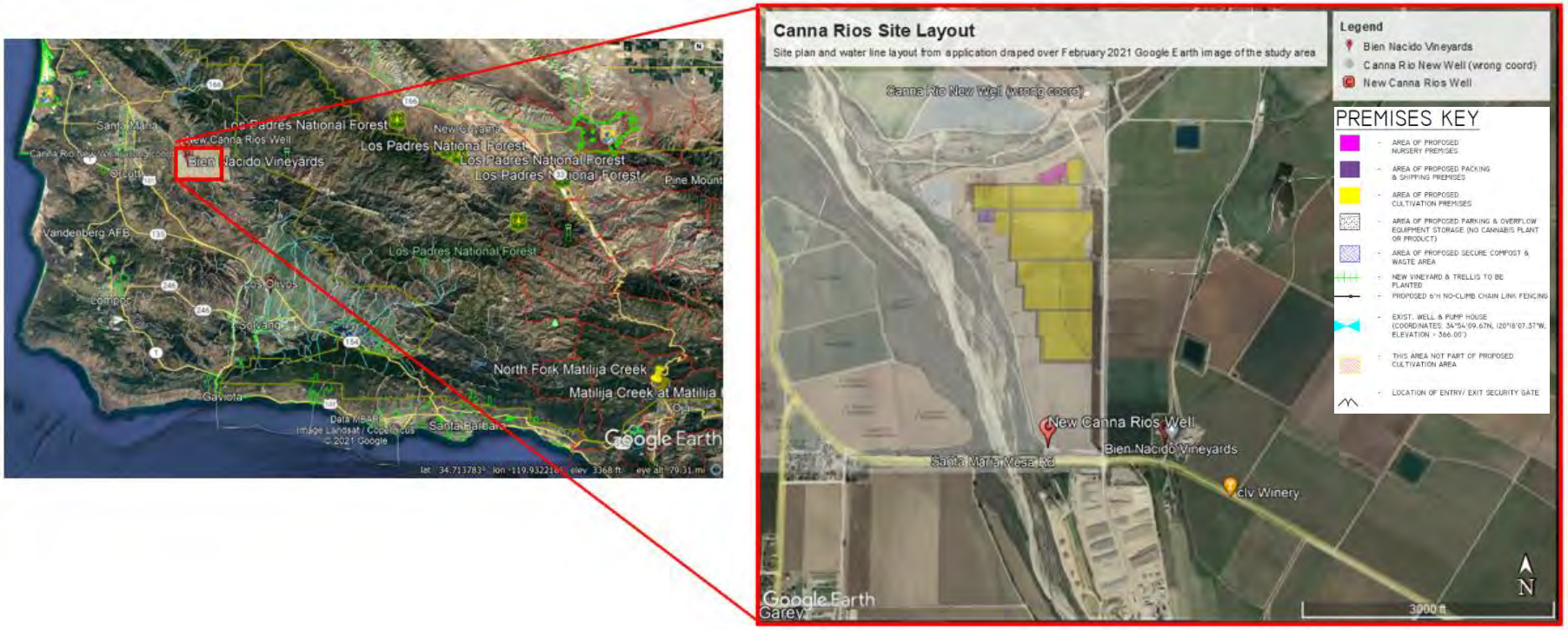


Figure 1. Canna Rios site location, layout and land uses in nearby vicinity (adapted from sheet P1, Overall Site Plan & Project Info, Canna Rios permit application)

the Canna Rios property, located at the confluence of the Sisquoc River flowing in from the east and the Cuyama River flowing in from the south.

2.1. Regional Setting

Figure 2 shows the extent of the entire Santa Maria Basin, with the Canna Rios study area identified by the red rectangle. Relevant geological studies for this portion of the Santa Maria Basin include geologic quad maps for the area (Dibblee et al., 1994a and b) for the Sisquoc subbasin at the eastern limit of the Basin, and for the northeast rim of the Basin (Dibblee et al., 1994c), within which lies the Canna Rios site. These geologic maps are complemented by the detailed hydrogeologic synthesis of the geology and hydrology by Cleath and Associates (2004) for Rancho Sisquoc, located along the Sisquoc River approximately 5 miles upstream from the study area. In addition, the technical report supporting the basin boundary change application (Santa Barbara County Water Agency, 2018) provides an up-to-date synthesis of historical data and literature on the Basin.

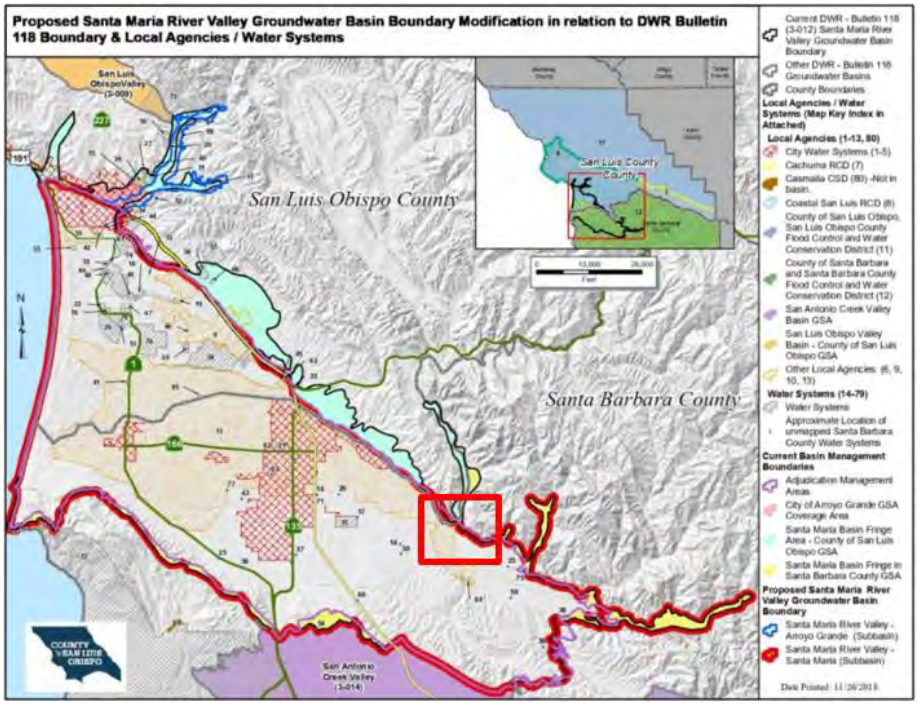


Figure 2. Regional map show extent of Santa Maria Basin per DWR Bulletin 118 and proposed basin boundary change in San Luis Obispo county; Canna Rios property within red box (adapted from San Luis Obispo Water Agency, 2018)

The Basin is a 288 square mile alluvial basin bounded on the north by the San Luis and Santa Lucia Ranges, on the east by the San Rafael Mountains, on the south by the Solomon Hills and the San Antonio Creek Valley Groundwater Basin, on the southwest by the Casmalia Hills, and on the west by the Pacific Ocean. As described by the Santa Barbara County Water Agency (Young and Scrudato,2018), "… The primary aquifers of the Santa Maria Valley portion of the Basin are

composed of gravel, sand, silt and clay contained within a northwest/southeast trending syncline of consolidated sedimentary and metamorphic rocks. The consolidated rocks form the surrounding hills of the valley and do not yield significant amounts of groundwater to wells (Luhdorff and Scalmanini, 2018). The primary water bearing units within the Basin are the Orcutt Formation, Paso Robles Formation, and Careaga Sand of Tertiary age. Water bearing formations extend to a depth of up to 2,800 feet below surface. Water bearing formations thin to the east and extend an unknown distance beneath the Pacific Ocean to the west. A confining layer is known to extend eastward from the coast to about the City of Santa Maria."

2.2. Hydrogeologic Setting for Canna Rios Project

Zooming in from the regional scope as presented in **Figure 2** above, the topic of the site hydrogeologic setting is approached in two steps. In the first (**Section 2.2.1**), we consider the geology and hydrogeology over an approximately 10,000-acre area centered on the Canna Rios project property. At this intermediate "vicinity" scale, one can gain an understanding of the hydrogeologic structures and deposits within which the Canna Rios site (and its water supply well) finds itself. From there, in **Section 2.2.2** the focus is on the proposed Canna Rios principal water supply well.

2.2.1. Hydrogeologic Setting in Canna Rios Vicinity

As described in the above quote on the Santa Maria Basin structure, along this northeast edge of the basin where the Canna Rios site is located, the tertiary aquifer units (Orcutt, Paso Robles, Careaga) that provide groundwater supplies to the users in the central parts of the basin thin somewhat. Proceeding from the central Basin further to the northeast, these water-bearing units are then truncated where the foothills of the San Rafael mountains rise abruptly. At this location, the West Huasna – Foxen Canyon Fault truncates the basin deposits. These foothills and terraces perched above the valley are underlain by older alluvium atop Paso Robles formation while further upslope the mountains are underlain by non-water-bearing consolidated sedimentary units (Monterey and Sisquoc formations) and metamorphic rocks, which do not yield significant quantities of water to wells.

The geologic setting here is well described by Dibblee et al. (1994c) surface geologic map and cross section. **Figure 3** presents the local surface geological map for the northern Santa Maria Basin study area (Dibblee et al., 1994c) draped atop a Google Earth image; the Canna Rios property is also included in the image. Here one can clearly see that the entire Canna Rios properties is underlain by alluvial river deposits of the Sisquoc River along the southern portion of the property and from the Cuyama River along the western portions of the property. This geologic map showing extensive ground surface coverage by highly permeable river alluvial is consistent with a review of by five separate USGS topographic quad maps distributed in time over the period from 1905 to 2012; these maps show the river channel in different locations over time.

Figure 4 presents the geologic cross-section from Dibblee et al. (1994c); this section crosses the study area just east of the Canna Rios property (heavy red line in **Fig. 3**). This hydrogeologic profile clearly exhibits the geologic structure that causes the abruptly rising foothills of the San Rafael Mountains just north of the Canna Rios property. Specifically, **Figure 4** shows the West Huasna fault at the mountain front, with a vertical displacement of more than 1,500 feet (the separation distance of the top surface of the Monterey formation on either side of the fault). The fault, however, however does not show significant displacement in the Paso Robles formation and younger deposits.

The cross section also shows the representative location of the Canna Rios property as well as that of the adjacent Bien Naci do Vineyards. Like the geologic map (**Fig. 3**), the cross section shows the Canna Rios property is underlain by river gravels from the ground surface to the depth that it encounters the underlying Paso Robles formation. As described below in the discussion of the Canna Rios well (**Sec. 2.2.2.2**), the thickness of the recent river alluvium is approximately 185 feet at that location.

Figure 3. Geologic map (Dibblee et al., 1994c) of study area overlain on February 2021 Google Earth image. Canna Rios proposed irrigation water supply well location also shown ("New Canna Rios Well"), as well as geologic cross-section line (see Fig. 4 for geologic cross section and legend of geologic formations)

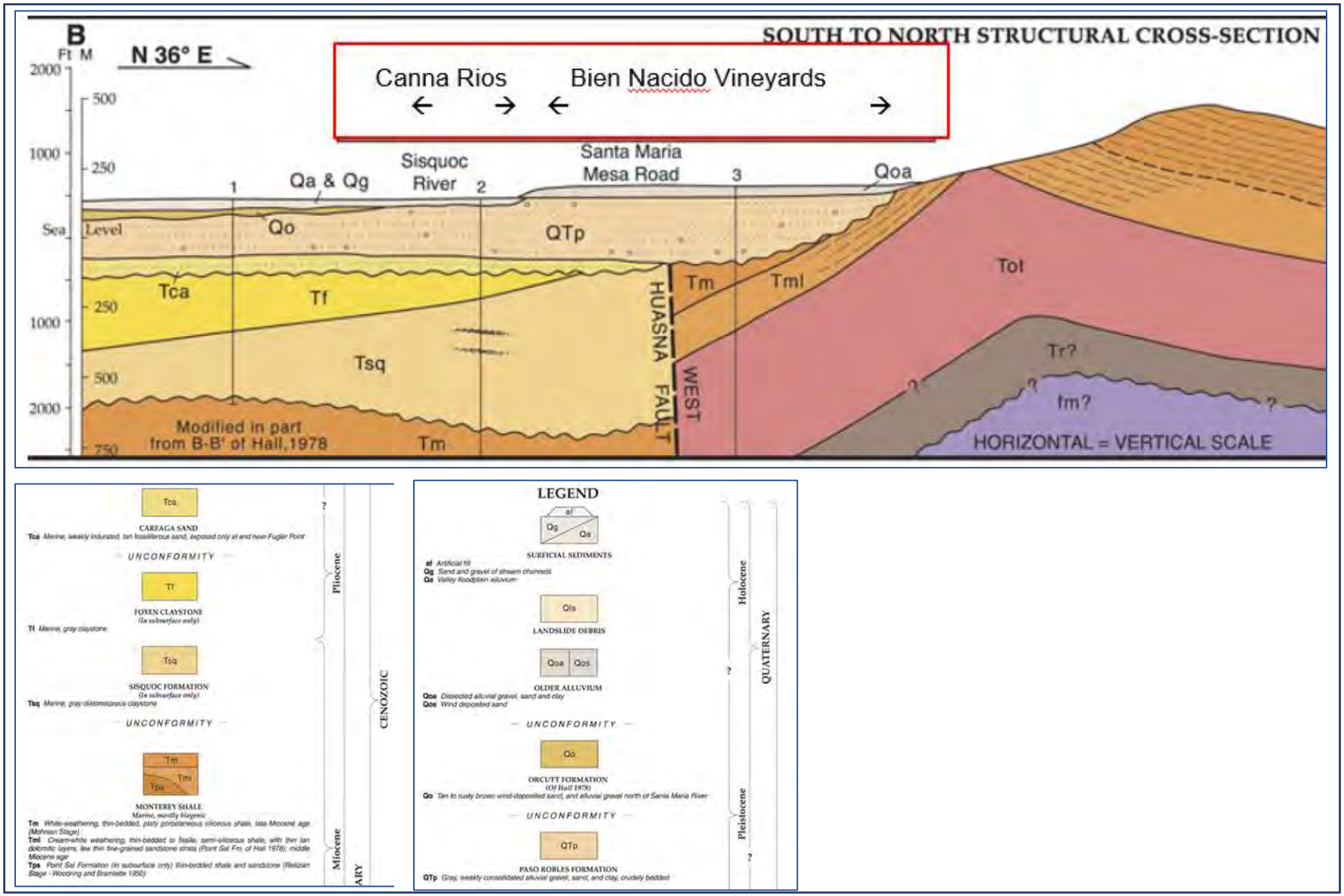


Figure 4. SW-NE geologic cross section of Canna Rios Project vicinity (adapted from Dibblee et al., 1994c)

2.2.2. Canna Rios: Well Location and Site Hydrogeology

According to documents included in the Canna Rios permit application (Plates, P1, W2, and UT.1), the cannabis project irrigation supply will be provided by a well located on their property just north and east of the Santa Maria Mesa Road bridge crossing over the Sisquoc River. This is labeled as "New Canna Rios Well" in **Figure 1**.

2.2.2.1. Project Irrigation Supply Well Location

Also included in the application package was a driller's log and well construction log for a well, SB Co well permit # 0001567. It was presumed that this well log was for the proposed project irrigation supply well, but the location of the well on the permit is completely different than that shown in the application. The location provided on the permit application plots the well at the location labeled "Canna Rio New Well (wrong coord)" in **Figure 1**.

Reviewing aerial images for this "wrong coord" location from 2009 through present shows this location in the middle of a cropped field with no associated well infrastructure. A "windshield tour" of the area from public roads by Dr. McCord on November 1, 2021, confirmed the existence of a well-maintained irrigation well (**Fig. 5**) at the location of the "New Canna Rios Well" shown in **Figure 1**. Lacking additional information, for all subsequent analyses we will apply the data from well log provided the applicant for SB Co well permit # 0001567, assuming it is representative of the hydrogeologic profile. If the applicant provides additional data or information for the well shown in **Figure 5**, the analyses described herein may need to be updated.

Figure 5. Top image is a photo taken by Dr. McCord on 01 November 2021 from shoulder of Santa Maria Mesa Road looking north at location of irrigation supply well identified in Canna Rios permit application. The bottom image shows aerial view of well location, with red box indicating location on road shoulder where the photo was taken and blue shading showing current location of the Sisquoc River channel.

2.2.2.2. Project Irrigation Supply Well Hydrogeology

As noted above, the Well Completion report for SB Co well permit # 0001567 was provided in the application package. This report includes both the driller's lithologic log and the well construction log. A copy of the lithologic log is provided below in **Table 1**. Related to interpretation of the geologic log recorded in the completion report, we relied on the descriptions provided in the "Material Description" column rather than the "Material Type" column. The "Material Description" column is more consistent with the placement of the well screen in the well construction description. For example, the top of the screen at a 260-foot depth is seventeen feet below the top of the shale layer noted in the material description column, and this placement makes sense hydrogeologically. Conversely the top of well screen placement makes no sense when referring the "Material Type" column, as that column indicates

Table 1. Geologic log copied from SB County well permit # 0001567

Geologic Log - Lite					
Depth from Surface Feet to Feet		Material Type	Material Color	Material Texture	Material Description
0	57	Gravel			Fine & Coarse Sand
57	115	Gravel			Fine & Coarse Sand
115	165	Clay	Light Brown		Gravel; Fne & Coarse Sand
165	185	Gravel			Mostly Coarse Sand; Fine Sand
185	243	Gravel			Shale; Streeks of white clay; Some Lght brown Clay; Fine Sand
243	306	Clay	Light Gray		Streeks of White Clay, Fine Sand
306	350	Clay	Blue		Fine & Coarse Sand
350	456	Sand	Blue	Coarse	Fine Sand
456	548	Gravel	Blue		Light Green Small Gravel; Coarse & Fine Sand
548	600	Gravel	Gray		Black chirt; Coarse & Fine Sand

the top 90 feet of the well screen would be in clay.

The information in the Well Completion Report has been condensed and summarized schematically in **Figure 6**, showing both the geologic media profile perforated by the well bore, and also the materials and depth intervals used in the well construction. In this figure and **Table 1**, important items to note include:

- The top 115 feet of the borehole is penetrating highly permeable fine and coarse sands
- Then from the 115-foot depth to the 185-foot depth, the borehole penetrated even coarser materials, more dominated by gravels and coarse sands, and thus even more permeable sediments
- At the 185-foot depth, the material description indicates that shale and clasts with streaks of white clay are beginning to be seen in the drill cuttings. Given that much of the Paso Robles formation is made up of detritus of Monterey shale eroded off the

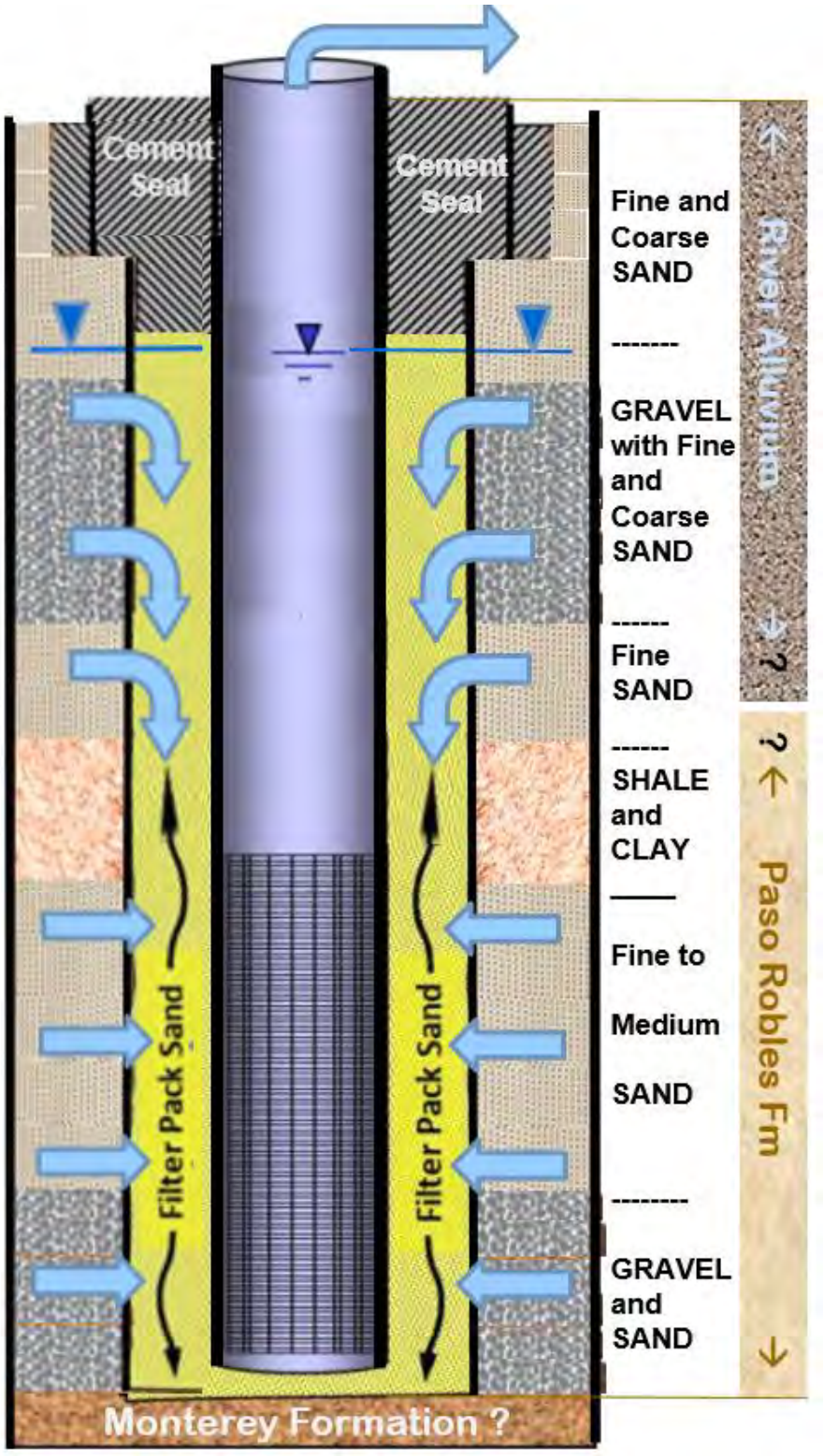


Figure 6. Schematic diagram showing geologic log and well construction for Canna Rios well permit # 0001567

adjacent uplifting mountains and that the Monterey contains significant thicknesses of white shales, the Material Description "shale, streaks of white clay" on the log suggests that this is the depth where the borehole encounters the top of the Paso Robles formation.

- Below this shaley layer, at a 243-foot depth, the borehole encounters fine-to-medium sands of the Paso Robles Formation to a depth of 456 feet below ground surface (bgs).
- The bottom 144 feet of the borehole, from 456 feet to the total depth of 600 feet, penetrate through coarser sands with some small gravels.
- It appears from the well construction diagram that the shaley and clayey materials at the 185-foot to 243-foot depth are being interpreted as a low permeability "aquitard" horizon, based on the placement of the top of the well screen at 260 feet bgs.
- Conceptually, a low-permeability aquitard layer could limit the hydraulic connection between the highly permeable river alluvial deposits above the aquitard and the permeable layers of the Paso Robles formation below the aquitard.

2.2.2.3. Local Hydrogeology and Well Completion Strategy

Also included in the Canna Rios application package was a letter from applicant attorneys BHFS (Steinfeld, 2021), describing certain aspects of the project water supply system. While the memo raises a number of favorable points related to native groundwater availability, historical uses, and future water demands, the memo is silent on groundwater connected to surface water. Based on the well lithologic and construction logs (**Fig. 6**), it is clear that this well will access connected groundwater in the Sisquoc River alluvial aquifer. Due to connected groundwater diversion constraints (see below), some of the water availability points raised in that memo may be rendered moot.

To mitigate against potential adverse impacts to streamflows by diversions of connected groundwater for cannabis irrigation, the SWRCB has adopted forbearance limitations to diversions based on both calendar dates and instream flow gages calculating riparian water flow, summarized as:

- The diversion season is from December 15 of each year to March 31; diversions can occur during this period so long as flows in nearby connected stream exceed promulgated instream flow targets[1].
- No diversions shall occur during the period from April 1 through October 31

Per these rules, in a "normal year" the maximum time period available for well pumping would be 105 days, from December 15 through March 31 of the following year.

The actual "as-built" construction of the well does not meet the objective of producing only native groundwater, which would not be subject to this constraint. Specifically, the hydraulic isolation could be afforded by the shale-clay layer at the 185-foot depth is essentially short-circuited by the annular

[1] For the period of November 1 through December 15 of each year, diversion may be authorized under certain circumstances (Section 3, Requirement 5 of SWRCB, 2019)

sandpack in the well. In other words, as shown in **Figure 6**, the highly permeable saturated alluvium layers above the shale-clay layers are hydraulically connected to the deeper well intake screen via the well filter pack sand. One can view it like a vertical pipe, allowing shallow connected groundwater to cascade into the wellbore and get pumped to the surface for cannabis irrigation.

2.2.3. eWRIMS Map of Study Area

To provide transparency in water rights administration, the State Water Resources Control Board (SWRCB) developed the eWRIMS (electronic Water Rights Information Management System). The eWRIMS is a computer database developed by the State Water Resources Control Board to track information on water rights in California. It contains information on Statements of Water Diversion and Use that have been filed by water diverters, as well as registrations, certificates, and water right permit and licenses that have been issued by the State Water Resources Control Board and its predecessors.

Map-based access to the system is provided through the online eWRIMS GIS web mapping tool. Using the web mapping tool, one can search for the location of water rights by visually displaying the location of point(s) of diversion on a map or aerial photograph. If you find water rights using this method, you can use the eWRIMS Database System (above) to search for information about the water rights.

Using the eWRIMS mapping tool, a snapshot of the study area was taken., and this is reproduced in **Figure 7**. From this image, the nearest reported Points of Diversions (PODs, shown as colored squares) from the alluvial groundwater are slightly that three miles upstream along the Sisquoc River. Of these

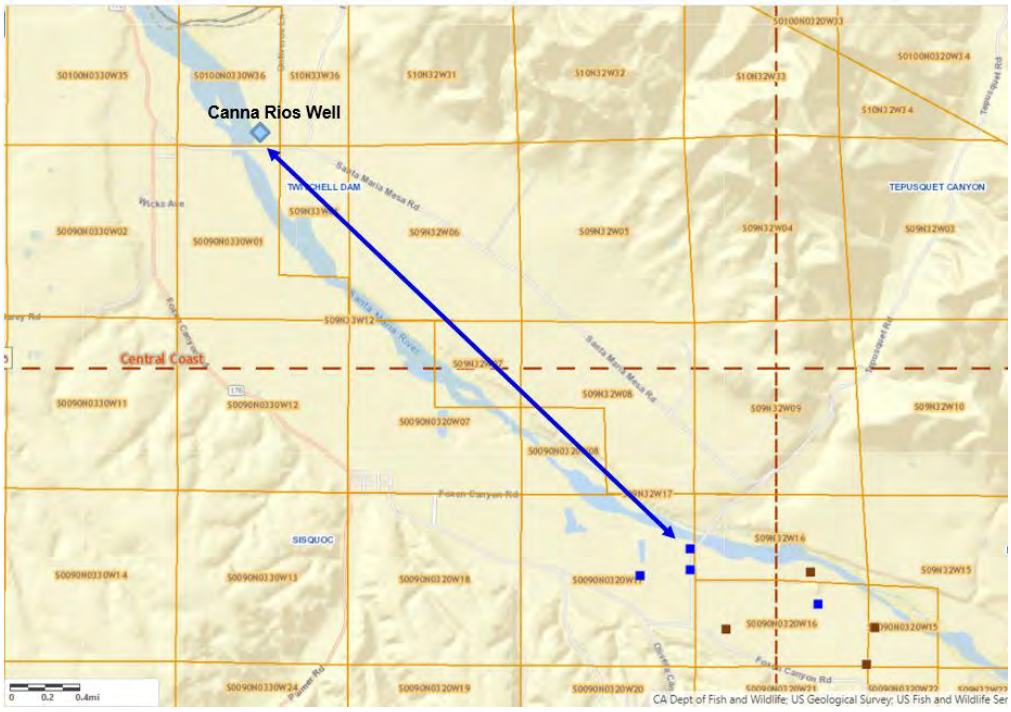


Figure 7. Image from eWRIMS online mapping tool showing PODS located 3 miles upstream on the Sisquoc River

PODs, those closest to the Sisquoc River channel (blue shading) are mapped to be within the recent river alluvium per the USGS geological maps (Dibblee et al., 1994a, c), just as is the entire Canna Rios property is mapped to be within the recent river alluvium (**Figure 3**).

2.2.4. Conclusion on Groundwater Produced from New Canna Rios Well

In summary, based on the location of the well within the Sisquoc River alluvium right near the river channel, the descriptions of the local hydrogeologic setting, and the well completion report and driller's log, Canna Rios Well 0001567 is presumed to produce groundwater that that is strongly connected with surface water. Such connected groundwater should be considered as administered conjunctively with surface water by the State Water Resources Control Board (SWRCB).

It is important to note again that the well location information on Permit 0001567 appears to be in error. If new information becomes available related to the New Canna Rios Well located as shown in **Figures 1** and **5**, this conclusion may need to be updated.

2.2.5. Nearby Wells

Well completion reports were obtained for six additional wells located within one-and-a-half miles of the Canna Rios irrigation supply well. When reviewing the summaries below, please note that any interpretation on the geologic profile should be considered approximate due to different descriptions provided by different drillers.

- Well 10N33W36_18265 is located approximately 1,310 feet north of the Canna Rios irrigation supply well. This well exhibits a very similar hydrogeologic profile as the Canna Rios well, with the top 163 feet apparent river alluvium, underlain by 390 feet of paso Robles formation, before bottoming out in Monterey formation bituminous shale at 556 feet bgs.
- Wells 10N33W36_39389 and 10N33W36_39389are in the same section but cannot be located any more precisely well completion report information. Both appear to penetrate approximately 100 feet of alluvium before encountering underlying formations.
- Well 10N33W35_E0234783 is difficult to located based on a hand-drawn map in the well completion report. The map is good enough to indicate this well is located on the opposite (west) side of the Sisquoc River.
- Wells 09N33W01E-254984 and 09N33W01_E-271817 are both located to the southeast along either side Santa Maria Mesa Road. The surface geology at both these well sites is older alluvial (Qoa) terrace deposits on the order or 50 – 100 feet thick sitting atop the Paso Robles formation.

Figure 8 shows the same geologic profile as the presented in Figure 4, but with 3x vertical exaggeration. Based on the above descriptions, the Canna Rios well and the others in T10NR33W Section 36, appear to be located in alluvial deposits as shown schematically by the red "well."

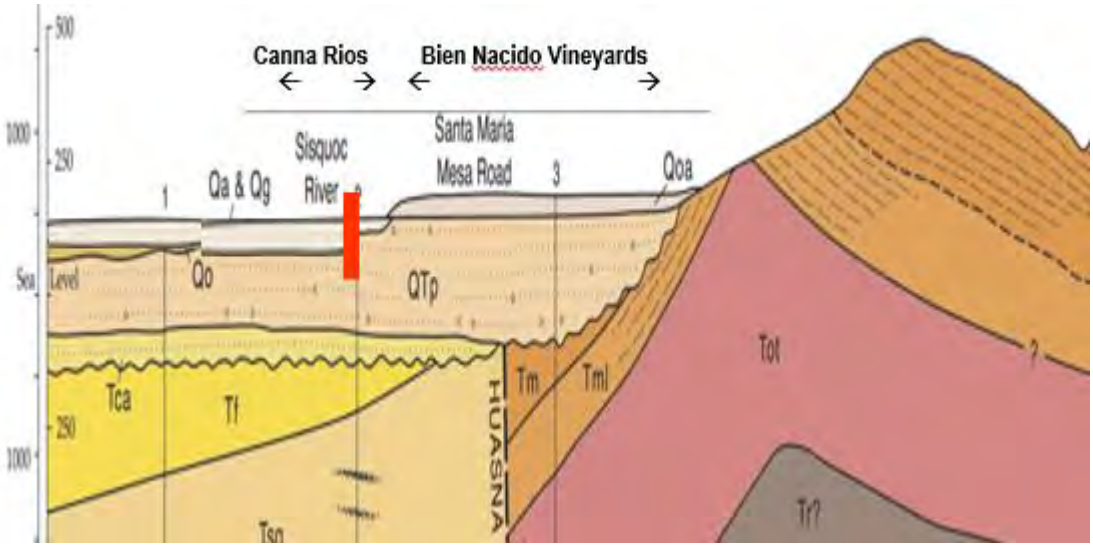


Figure 8. Blown-up vertical section from Fig. 4, showing location of Canna Rios Well in Sisquoc River alluvium (adapted from Dibblee et al., 1994c)

3. IMPACT OF CANNA RIOS WELL PUMPING

In the practice of quantitative hydrogeology, one commonly uses groundwater models to estimate interactions between aquifer flows and flows in connected surface water (Barlow and Leake, 2012). The models used to quantify those flows can range from simple mathematical equations (Barlow and Moench, 1998; Reeves, 2008) to highly detailed groundwater computer models (Barlow and Leake, 2012). The best way to evaluate the connection between the CANNA RIOS wells and the adjacent Sisquoc River would be via a well-calibrated three-dimensional groundwater model, but such a model is unavailable to evaluate the Canna Rios well impacts.

Given the lack of a suitable detailed groundwater flow model for the study area, simplified mathematical equations (Reeves, 2008; Barlow and Leake, 2012) are applied utilizing the data cited above (Worts, 1951; Cleath and Associates, 2004;) to demonstrate potential impacts of CANNA RIOS well pumping on seepage losses from the Santa Maria River.

3.1. Impact on Sisquoc River Stream – Aquifer Interactions

As first described in the seminal paper by USGS Scientist Charles V. Theis (1940)[2] and more recently summarized by Barlow and Leake (2012), installing and then pumping a well in an aquifer system that is hydraulically connected with a surface water flow will lead to a transient response in the overall hydrologic system such as that illustrated in **Figure 5**:

[2] Theis, C.V., 1940, The source of water derived from wells—Essential factors controlling the response of an aquifer to development; Civil Engineering, v. 10, no. 5, p. 277–280.

"(A) Under natural conditions, recharge at the water table flows toward and eventually discharges to the stream as baseflow. (B) When pumping begins, all of the water pumped by the well is derived from water released from groundwater storage, i.e., by a lowering of the "water table" and associate drainage of water from aquifer pores. The groundwater level drops most significantly right at the wellbore, and the drawdown of the groundwater level decreases as one moves farther from the pumping well, creating what is often referred to as a "cone of depression" in the water table. (C) As the cone of depression expands outward from the well, the well begins to capture groundwater that would otherwise have discharged to the stream. (D) In some circumstances, the pumping rate of the well may be large enough such that the cone of depression extends to the stream, causing water to flow from the stream to the aquifer, a process called induced infiltration of streamflow. Streamflow depletion is equal to the sum of captured groundwater discharge and induced infiltration."

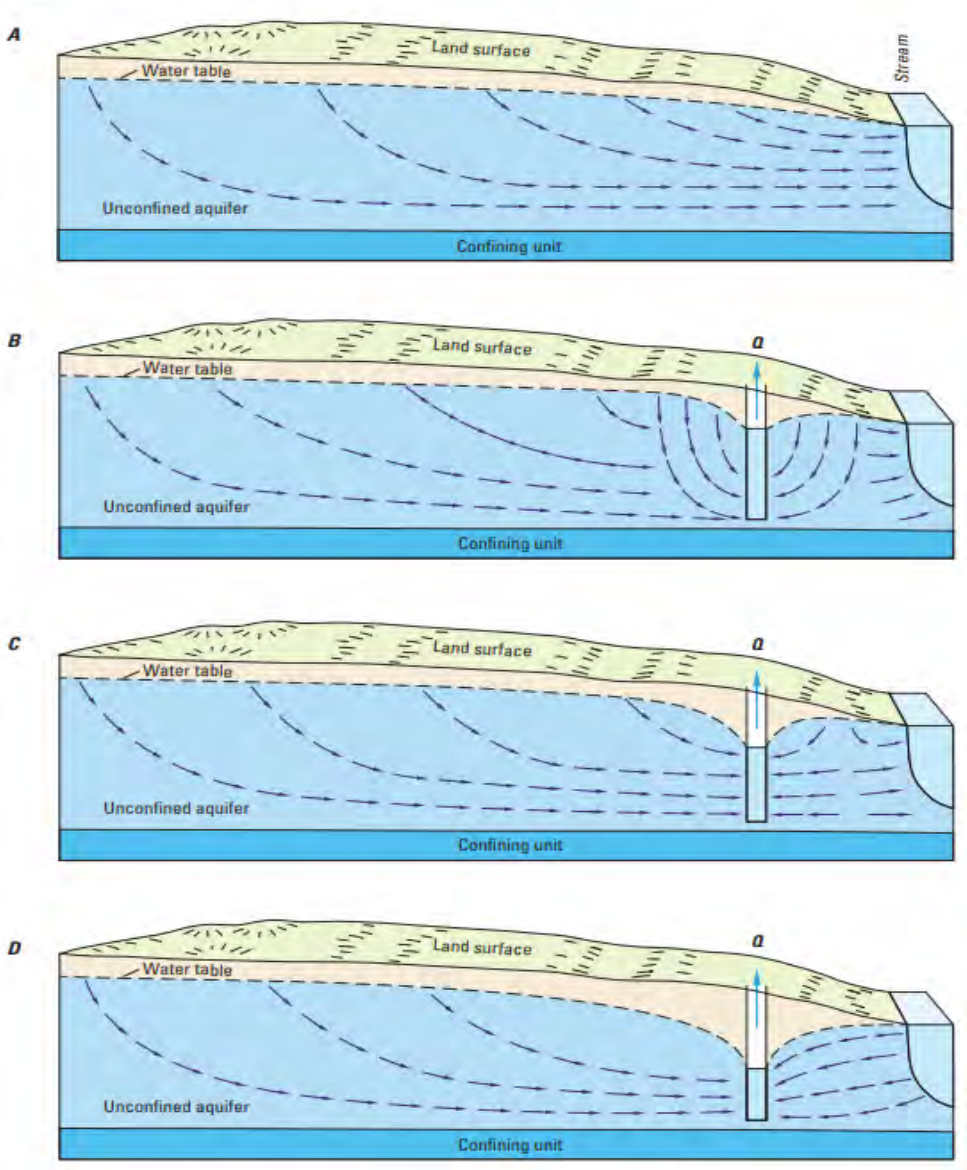


Figure 9. Transient evolution of groundwater flow patterns and surface water – groundwater interactions in response to installation and pumping of a ground water well in the vicinity of a hydraulically connected surface stream (from Barlow and Leake, 2012)

To simulate this stream – aquifer interaction behavior, analytical mathematical equations have been developed the model that transient response described above for simplified conditions such as constant aquifer properties, constant well pumping rate, and constant water level in the connected stream.

3.1.1. Analytical Estimates of Sisquoc River Depletion due to CANNA RIOS Well Pumping

Based on the hydrogeological conceptual model of described above with the Canna Rios well installed in Sisquoc River alluvium, it was determined that the analytical mathematical equation of Hunt (1999) provides a simplified model for calculation of impacts of Canna Rios well pumping. Specifically, that model (Hunt, 1999; Reeves, 2008, eqn. 5) model is designed to represent a well installed in a permeable aquifer underlain by a low permeability basement and connected to a stream that partially penetrates the top of that same aquifer. This model was coded into a computer tool that can be downloaded from the USGS (Reeves, 2008) to evaluate representative situations of interest.

It is recognized that this simple model is applicable to situations when the Sisquoc River is flowing, which occurs only during the rainy season. Thus, the analysis below is intended to illustrate the strong impacts of well pumping on surface water flows, rather than to provide a definitive quantitative prediction.

3.1.2. Input Parameters for Stream – Aquifer Interaction Model

The key inputs to the Hunt (1999) stream – aquifer interaction model are:

- Well pumping rate and distance from the nearest Canna Rios well to the river
- Hydraulic conductivity, storage, and saturated thickness of the aquifer

The following subsection describe how each of these inputs were determine from site-specific data.

3.1.2.1. Well Pumping Rate

The Canna Rios irrigation well pumping rate depends on two factors: (i) the total annual crop water demand and (ii) the length of the diversion season.

- The annual water demand depends on the acreage, and the Canna Rios application indicates that 48 acres will be placed under cannabis cultivation. As described in the Canna Rios application package (Steinfeld, 2021) the duty of water (also commonly known as the Consumptive Irrigation Requirement, of CIR) for a cannabis with two crops annually is 2.2 acre-feet (af) per acre (af/ac), which is consistent with a detailed analysis of cannabis crop water use in the Central Coast (e.g., Agrosource Group, 2021), this means that 105.6 af of water will be needed annually (on average) to meet the irrigation requirement. Assuming a 95% efficiency of the drip irrigation system, this means that 111.2 af of groundwater would need to be pumped to meet the CIR demand.
- As stated above in **Section 2.2.2.4**, Canna Rios Well 0001567 is presumed to produce connected groundwater that is administered conjunctively with surface water by the State Water

Resources Control Board (SWRCB) . As described above in **Section 2.2.1.3**, per Water Boards rules related diversion of water for cannabis production (SWRCB, 2017, 1019[3]), in a "normal year" the maximum time period available for well pumping would be 105 days, from December 15 through March 31 of the following year. To obtain 111.2 af of water over a 105-day pumping period would require an average total pumping rate of 169.1 gpm.

Since the Canna Rios well sandpack straddles two permeable formations (**Figure 6**), when pumped It is drawing water from both those units. One simple and widely applied approach for estimating the fraction of total well flow is coming from each of the two units employs a transmissivity weighting scheme[4]. By this measure and since the river alluvium is much more permeable than the Paso Robles formation (see **Section 3.1.2.3** below), the alluvial sediments with connected groundwater can deliver approximately 70% of the total 169.7 gpm well flow, or as much as 119 gpm.

Another potential constraint on the Canna Rios well extraction of connected alluvial groundwater is the maximum vertical flow rate in the sandpack from 185-foot depth to the 243-foot depth where the borehole is penetrating the low permeability shaley layer. By the wellbore diameter of 28 inches and the screen diameter of 16.6 inches, there is nominally a 6-in thick annular space around the well screen that is filled with high permeability uniform sand. For this sandpack geometry together with a reasonable estimate for permeability of the sandpack (3 mm rounded sand) and an assumption of gravity driven vertical flow downward through the sandpack, the 119-gpm inflow of connected alluvial groundwater into the wellbore may be able to flow downward through the sandpack to the well screen, but not much more than that.

3.1.2.2. Well Distance to River

Using the Google Earth measuring tool, and pacing , it was estimated that the Canna Rios well is located approximately 100 feet to the the bank of the Sisquoc River channel is closest to the well (**Figure 5**).

3.1.2.3. Hydraulic Conductivity, Storage, and Saturated Thickness of the Aquifer

Given that lack of site-specific data on aquifer tests and hydraulic conductivity for the river alluvium and Paso Robles sediments in this area, one must rely on literature values. Remarkably, a comprehensive synthesis of the hydrogeology of the Santa Maria Basin has not been undertaken for 70 years, since the USGS study of the basin in 1951 (Worts, 1951). This is underlined by the fact that the most recent publicly available annual report on the Santa Maria Basin Adjudication (Luhdorff & Scalmanini, 2020) frequently cites Worts (1951) as their principal data and information source throughout their Section 2.1.1 "Geology and Aquifer System." Worts (1951) provides a summary of information of water bearing properties of both the deeper consolidated rocks as well as the shallower unconsolidated aquifer units, including the Paso Robles formation and the recent River Alluvium[5].

[3] https://www.waterboards.ca.gov/water_issues/programs/cannabis/cannabis_water_quality.html
[4] According to Neville and Tonkin (2004), the transmissivity weight approach is strictly correct only for steady, radial flow. At early time the fraction coming from the higher transmissivity layer would be even higher.
[5] Table of "Stratigraphic units of the Santa Maria Valley area, California" insert between pages 22 and 23, copied from Plate No. 2

Table 2 presents the hydraulic conductivity values reported by Worts (1951) for the River Alluvium and the Paso Robles formation.

Table 2. Range of hydraulic conductivity values reported for the River Alluvium and Paso Robles formation in the Santa Maria Basin, as described by Worts (1951)

	K (ft/d)		
Formation	min	avg	max
Recent River Alluvium	141.7	371.6	601.6
Paso Robles	8.7	26.1	43.4

These values for the Sisquoc River Alluvium are very close to those compiled for the Santa Ynez River alluvium as reported in the Santa Ynez River Basin Groundwater Sustainability Plan (GSP; GSI Water Solutions, 2020). For the Paso Robles formation, the average value for hydraulic conductivity in the Santa Maria Basin reported by Worts (1951) is about twice as high as the average value for employed in the Santa Ynez Basin GSP groundwater model[6] (GSI Water Solutions, 2020). Given that data presented above indicates that groundwater in the Sisquoc River alluvium is well connected with surface in the river, the subsequent analyses below focus on the River Alluvium.

3.1.3. Results of Stream – Aquifer Interaction Model

Utilizing the input parameters identified in Sections 3.1.2.1 through 3.1.2.3, the Hunt (1999) model was employed to estimate streamflow leakage induced by CANNA RIOS well pumping is shown in **Figure 10**, which presents streamflow leakage over time since well pumping begins on December 15, the first day of the "diversion season" per SWRCB rules (see Section 3.2.2.1). There are a number of items to note in this result:

- Due to the close proximity of the Canna Rio irrigation supply well to the Sisquoc River channel, the impacts to surface flows in the river would be almost immediate, with more than 30% of the

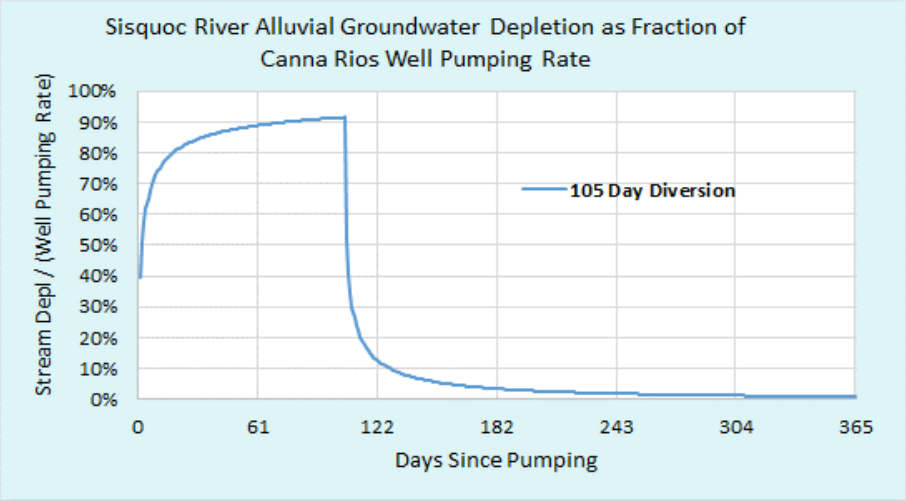


Figure 10. Daily Sisquoc River streamflow loss rates as a fraction of Canna Rio well pumping

[6] In hydrogeology, a factor of two difference in hydraulic conductivity is not considered large, as values between different unit typically can vary by factors of 10x.

pumping on day one offset by surface flow losses from the river. And the impacts to surface flows grow significantly from there, reaching more than 90% of the well pumping rate by the end of the 105-day diversion season.

- The streambed leakage does not immediately stop once the well it turned off. Rather, once the well is turned off, the leakage rate does drop precipitously at first, but the presence of the large cone of depression due to 105 days of pumping causes a continuing "lagged depletion" of stream flows. These lagged depletion effects are broadly recognized to occur in this type of hydrogeologic situation and must be accounted for when analyzing stream - aquifer interactions (Barlow and Leake, 2012; McCord et al., 2018). This lagged depletion effect can linger for months as streamflow losses continue to fill the cone of depression created in the alluvial aquifer during the previous diversion season pumping.
- Finally, the streamflow depletion rate curve (**Fig. 10**) can be integrated over time to obtain an estimate of the total volume of water that has leaked from the Sisquoc river due to CANNA RIOS well pumping. **Figure 11** presents this measure of leakage, showing that one year after pumping begins (at the start of the next year's diversion season), nearly 80% of the total volume of the previous year's pumping by the Canna Rios well would leak from the river to help fill the storage loss from the aquifer from the previous year's pumping.

It is important to note that these results should be considered preliminary based on data and information available at this time. Thus, they should be considered illustrative rather than definitive. If a more rigorous hydrogeologic flow model was available or later becomes available, and additional site-specific data obtained, more rigorous analyses can be undertaken.

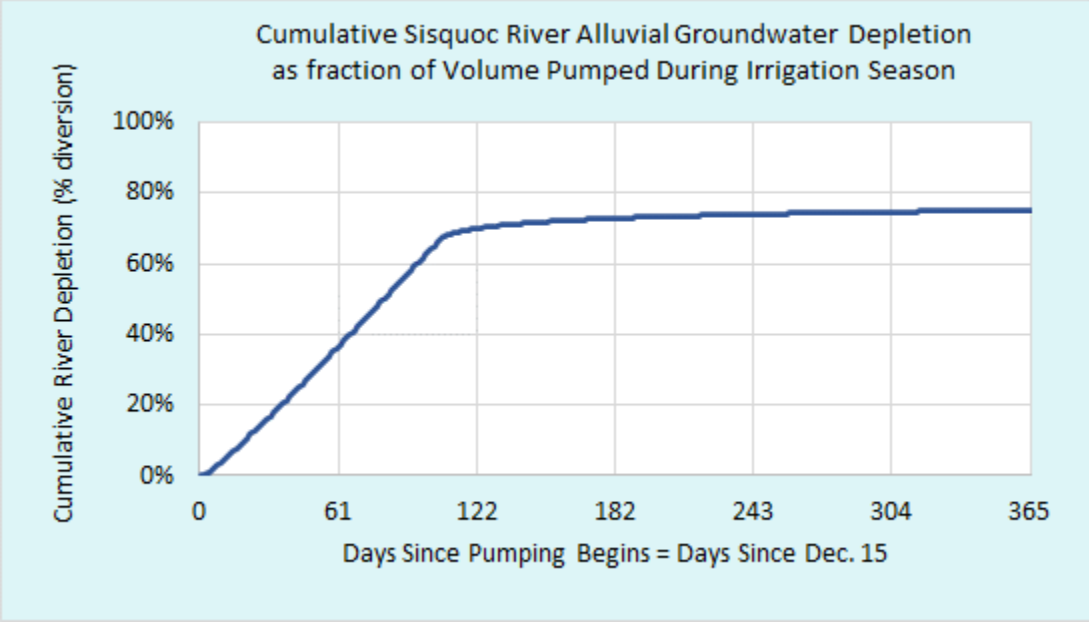


Figure 11. Sisquoc River streamflow losses induced by Canna Rios well as a fraction of volume pumped over the 105-day diversion season

3.2. Interference Drawdown Impacts to Neighboring Wells

Due to the significant distance to the nearest wells (1,310 and 1,950 feet to the nearest wells at Bien Nacido Vineyards), drawdown impact from Canna Rios well pumping on those nearest wells is expected to be minor.

4. SUMMARY OF CONCLUSIONS

This report was developed to address hydrogeologic and irrigation water supply issues associated with the proposed Canna Rios cannabis production project, to be located at on property northwest of the intersection of Santa Maria Mesa Road and White Rock Lane, in the Santa Maria Valley near Garey, California. Specific findings and conclusions from this review include:

1. Based on our review of the geologic maps for the study area (e.g., Dibblee, 1994; Cleath and Associates, 2004) and the base map for State Water Boards eWRIMS online water rights mapping tool, it appears that the recently installed Canna Rios well is located within Sisquoc River alluvium.
2. Based on the location of the well within the Sisquoc River alluvium, the descriptions of the local hydrogeologic setting, and the well completion report and driller's log, Canna Rios Well 0001567 is presumed to produce groundwater that meets the criteria of connected groundwater that is administered conjunctively with surface water by the State Water Resources Control Board (SWRCB).
3. Analysis of the local conditions in the Sisquoc River alluvial aquifer and the well construction sandpack indicate that the river alluvium could be capable of producing as much as 70% of the total groundwater irrigation demand to be diverted by the Canna Rios well.
4. Stream – aquifer interaction analyses undertaken to simulate the effects of Canna Rios well pumping indicate that Sisquoc River losses could be as high as 90% of the well pumping rate, and cumulative losses from the river could be as much as 80% of the annual volume pumped.
5. Given these conditions, operation of the new Canna Rios well as a source for cannabis irrigation supplies will be constrained by SWRCB rules related to time periods when diversions to cannabis production projects are allowed to occur.

It is important to note that the above conclusions and opinions are based on available regional data, and only limited definitive data for the CANNA RIOS wells. Thus, quantitative estimates herein should be considered illustrative rather than definitive, and can be subject to change as new data and information become available.

Finally, it is important to note that this technical memo does not examine other key issues related to the Canna Rios project water supply beyond a hydrogeology focus. For example, the ability to store irrigation water diverted during Dec. 15 – March 31 diversion season to meet the total annual demand of more than 111.2 af (amount of water required for Cannabis production on 47.1 acres with a water

duty of 2.2 af/ac and with a 95% irrigation efficiency) is an important issue from an engineering and project feasibility perspective but is not addressed here.

5. REFERENCES

Agrosource Group, 2021. Technical Memo Re: ABL Partners LP Crop Water Usage Requirements, submitted to Santa Barbara County as part of ABL Partner cannabis production application.

Barlow , P. and A. Moench, 1998. Analytical solutions and computer programs for hydraulic interaction of stream-aquifer systems. Open File Report 98-0415, Chapter A.

Barlow, P., and S. Leake, 2012. Streamflow Depletion by Wells – Understanding and Managing Effects of Groundwater Pumping on Streamflow; US Geological Survey Circular 1376, 95 pp.

Cleath and Associates, 2004. Definition of Ground Water Basin Boundary, Rancho Sisquoc, Sisquoc California, Consultant Report prepared for Rancho Sisquoc.

DWR, 2018, Bulletin 118: Water for California, Rev. 5, 2018 Update, https://water.ca.gov/Programs/Groundwater-Management/Bulletin-118

Dibblee, T, et al., 1994a. Dibblee, T.W., Ehrenspeck, H.E., and Bartlett, W.L, Geologic map of the Sisquoc quadrangle, Santa Barbara County, California

Dibblee, T, et al., 1994b. Dibblee, T.W., Ehrenspeck, H.E., and Bartlett, W.L, Geologic map of the Foxen Canyon quadrangle, Santa Barbara County, California

Dibblee, T, et al., 1994c. Dibblee, T.W., and Ehrenspeck, H.E., Geologic map of the Santa Maria and Twitchell Dam quadrangles, Santa Barbara County, California

Halford, K.J., and R.T. Hanson. 2002. User guide for the draw-down-limited, Multi-Node Well (MNW) Package for the U.S. Geological Survey's modular three-dimensional finite-difference ground-water flow model, versions MODFLOW-96 andMODFLOW-2000. U.S. Geological Survey Open-File Report 02–293

Hunt, Bruce, 1999. Unsteady stream depletion from groundwater pumping, Ground Water, v.37, no. 1, pp 98 – 102.

McCord, J.T., S. Sigstedt, S. Gangopadhyay, and R. Uribe, 2018. Stream Depletion Factors, Unit Response Functions, and streambed properties for modeling lagged river depletions due to well pumping, Western Groundwater Summit, Groundwater Resources Association of California, September 2018.

Neville, C. and M.J. Tonkin, 2004. Modeling multi-aquifer wells with MODFLOW, Ground Water 42(6-7), pp. 910-919

Reeves, Howard W., 2008. STRMDEPL08 – An Extended Version of STRMDEPL with Additional Analytical Solutions to Calculate Streamflow Depletion by Nearby Pumping Wells. USGS Open-File report 20087-1166. https://pubs.usgs.gov/of/2008/1166/

Santa Barbara County, 2019. Final Environmental Impact Report (EIR) for the Cannabis Land Use Ordinance and Licensing Program (PEIR), Section 3.8 Hydrology and Water Resources

SWRCB, 2017, 1019. State Water Boards Cannabis Rules, https://www.waterboards.ca.gov/water_issues/programs/cannabis/cannabis_water_quality.html

Steinfeld, A., 2021. Water Analysis for Canna Rios Project (APN 129-040-010), 19LUP-0000-00116, Memorandum included in Canna Rios land use permit application package.

Theis, C.V., 1940, The source of water derived from wells—Essential factors controlling the response of an aquifer to development; Civil Engineering, v. 10, no. 5, p. 277–280.

Worts, G.F. Jr., 1951. Geology and Ground-Water Resources of the Santa Maria Valley Area, California, US Geological Survey Water-Supply Paper 1000, prepared in cooperation with Santa Barbara County, 176 pp.

Young, M., and M. Scrudato, 2018.Santa Maria River Valley Groundwater Basin: Basin Boundary Modification Request, Technical Report prepared for California Dept of Water Resources BBMR.

APPENDIX A: CURICULUM VITAE – Dr. James T. McCord, PE

Jim McCord, Ph.D., P.E.

Principal Hydrogeologist / Water Resources Engineer

Education

Ph.D., Geoscience, Dissertation in Hydrogeology, New Mexico Institute of Mining and Technology, 1989

M.S., Hydrology, New Mexico Institute of Mining and Technology, 1986

B.S., Civil Engineering, Virginia Polytechnic Institute and State University, 1981

Memberships/Affiliations

Professional Engineer (New Mexico #15568, in process for California)

Member, California Groundwater Resources Assoc.

Member, New Mexico Geological Society

Languages

English, Mother Tongue

Spanish, DELE (Diploma in Spanish as Foreign Tongue) Level 2, Fluent spoken and written

Consulting Employment History

Lynker Technologies, LLC, Principal Hydrogeologist / Water Resources Engineer, 2021 – Present

IRP Water Resources Consulting
Principal Consultant, 2020 – 2021

Geosystems Analysis, Inc.
Principal Hydrogeologist, 2018 – 2020

Amec Foster Wheeler
Principal Water Resources Engineer 2007-2018

Hydrosphere Resource Consultants, Principal Hydrologist, 1999 – 2007 (acquired by Amec)

Daniel B. Stephens & Associates, Hydrology Group Leader, 1997-1999.

Summary

Dr. McCord has more than 32 years of experience in hydrology, hydrogeology, and water resource investigations, with emphasis on characterization of groundwater and surface water systems, numerical modeling of hydrologic systems, river basin planning and management, water supply and availability analysis, vadose zone hydrology, contaminant hydrology, surface water and groundwater interaction, water rights, and stochastic hydrology and geostatistics. Prior to embarking on his water resources consulting career, Dr. McCord was employed as Assistant Professor of Civil Engineering and Geology at Washington State University (1988 – 1990) and as Senior Member of the Technical Staff at Sandia National Laboratories (1990 – 1997), where he worked on radioactive waste management issues. Over his nearly 20 years with Hydrosphere and Amec Foster Wheeler (who acquired Hydrosphere in 2007), Dr. McCord served as New Mexico manager (1999 – 2007), Water Resources Technical Director for Texas – New Mexico (2007-2011), and Water Resources Technical Director for South America (2011 – 2016). He is a recognized expert in Vadose Zone Hydrology, has authored numerous consulting reports and technical peer-reviewed papers, and co-authored the textbook, *Vadose Zone Processes* (CRC Press, 1999). Following a listing of core skills is a listing of representative projects in sustainable groundwater management and water rights* in which Dr. McCord played an important role:

Core Skills

- Hydrogeology and Vadose Zone Hydrology
- Groundwater flow and transport modeling, from site- to basin-scale
- Unsaturated flow and contaminant transport
- Groundwater recharge processes
- Surface water/groundwater interactions
- Hydrologic analyses in Water Rights
- Crop Water Use / Irrigation Hydrology
- Mine water management
- Heap leach optimization studies

Project Experience

Sustainable Water Resources Management and Water Rights

GSP Groundwater Model Development, Santa Ynez River Basin Eastern Management Area

Santa Barbara County Water Agency, California, 2020 - current

Working under subcontract to GSI Water Solutions (GSI) for Santa Barbara County Water Agency, Dr. McCord led the development of a groundwater flow model of the Santa Ynez River Basin Eastern Management Area (EMA), in support of GSI's effort to develop the Groundwater Sustainability Plan (GSP) for the EMA. The EMA has been identified as a Medium Priority basin, with the GSP to be submitted at the end of 2021. As part of this effort, Dr. McCord worked closely with the GSI team on construction of the hydrogeologic

conceptual model (HCM) and a, annual timestep water budget, utilizing best available historical data and DWR requirements related to GSP development.

Development of Spatially Distributed Recharge Estimates and Surface Water-Groundwater Interactions for Aquifers in Central and West Texas.

Texas Water Development Board, 2020 - current

Teamed with WSP, LRE Water Consultants, and Dr. Raghavan Srinivasan (Texas A&M University), Dr. McCord is supporting a contract to Texas Water Development Board (TWDB) for Development of Recharge Estimates and Surface Water-Groundwater Interactions for Aquifers in Central and West Texas. The team is employing a variety of water budget and hydrologic modeling tools to obtain detailed rasterized estimates of recharge and surface water gains and losses for key stream reaches across the study area. Dr. McCord is leading the effort to evaluate the use of satellite-based tools such as GRACE and MODIS to compare to and in some cases help constrain the estimates.

Hydrology and Hydrogeology Expert Consultant, Casitas Municipal Water District

Casitas Municipal Water District, Ventura County, California, 2020 - current

For Casitas Municipal Water District (Ventura County, California), Dr. McCord is serving as a hydrogeology and hydrologic modeling expert in support of the District's TAC (Technical Advisory Committee) involvement and review of the integrated hydrologic – hydrogeologic – water quality model being developed by the State Water Boards for evaluation of fish flows for the Ventura River, review of models developed to support to GSPs in the Ojai and Upper Ventura River Subbasins, and for potential use of model in the ongoing groundwater adjudication for the basin.

Hydrology Expert, Navajo Nation, Zuni River Basin and Little Colorado River Adjudications

Navajo Nation Department of Justice, Arizona and New Mexico, 2007 - 2019

For the Navajo Nation DOJ, Dr. McCord served as the hydrology expert on two water rights adjudications (Little Colorado River Basin, Arizona, and Zuni River Basin, New Mexico). Tasks include evaluating water claims and demands (including agricultural, M&I, and domestic) by other water users in the basin, developing Navajo claims, evaluating surface water and groundwater supplies and availability in the basins, development of a three-dimensional groundwater flow model for the Zuni River Basin, evaluation and application of a unique surface water model (based on PRMS) to estimate surface water diversions - depletions associated with Hopi agricultural systems, development of expert reports, and expert testimony.

Water Supply and Water Rights Due Diligence for Vineyard Acquisition, Aconcagua River Valley, Chile

Confidential Client, California, 2018

For a confidential client, Dr. McCord led a due diligence assessment of the irrigation water supply reliability and sustainability for a 540-hectare vineyard property in the Aconcagua River Valley of Chile; currently only 105 hectares are being cultivated (1 hectare = 2.47 acres). The assessment included an evaluation of existing water rights (both surface water and groundwater) held by the farm, the historical yield of the surface rights, hydrogeologic analyses to identify preferred areas to install wells and thus perfect existing groundwater rights, and evaluation of various approaches (including groundwater banking) to increase the sustainability of the farm water supply.

GSP Groundwater Model Development, Santa Ynez River Basin Eastern Management Area

San Antonio Creek Basin Groundwater Sustainability Agency, Los Alamos, California, 2020 - current

Working under subcontract to GSI Water Solutions (GSI), Dr. McCord supported development of an annual and monthly timestep water budget tool, utilizing best available historical data and DWR requirements related to GSP development. He led the effort in bringing in gridded hydrologic data (recharge, ETo, ETa, and runoff) from the USGS Basin Characterization Model (BCM), adjusting the gridded data to honor local weather station monthly precipitation, and filtering and processing the data to develop future climate series that met SGMA requirements and incorporated climate change factors per DWR.

Groundwater Sustainability Plan Groundwater Model Development, Tulare Lake Subbasin, San Joaquin Valley

Tulare Lake Subbasin Groundwater Sustainability Agency, San Joaquin Valley, California, 2016 - 2020

Supported the development of the 3D groundwater flow model that will be used as the quantitative basis for development of a Groundwater Sustainability Plan (GSP) for the Tulare Lake subbasin in Kings County, California. The GSP for the Tulare Lake subbasin must be completed and delivered to DWR by 2020 per the requirements of the Sustainable Groundwater Management Act (SGMA). The preliminary model was delivered in March 2018, and the updated GSP model was delivered in December 2019.

Groundwater Hydrology Expert, Surface Water – Groundwater Interactions Along South Platte River

City of Boulder, South Platte Basin, Colorado, 2005-2011

Retained by the City of Boulder, CO as groundwater hydrology expert, Dr. McCord evaluated and critiqued numerous water supply augmentation plans submitted by alluvial aquifer water users / irrigators in the Lower South Platte River, Colorado. The evaluations focused on assessing the quantity and timing of depletions to South Platte flows caused by groundwater pumping. Most of the cases involved development and application of site-specific 3D numerical models of groundwater flow, and preparation of expert reports, as well as depositions and testimony in Colorado Water Court.

Hydrologic Impacts of Water Rights Acquisitions and Transfers, Middle Rio Grande Basin, New Mexico

Middle Rio Grande ESA Collaborative Program, NM ISC, 2004 - 2005

The Water Acquisition and Management Subcommittee (WAMS) of the Middle Rio Grande Endangered Species Act Collaborative Program made preliminary estimates of the volume of water required to meet the flow targets of the 2003 Biological Opinion regarding the silvery minnow. This study addresses how a water rights acquisition program in the Middle Rio Grande Basin might work, how water rights transfers might be affected, recommended terms and conditions for to be placed on transfers to avoid increased depletions in the basin, and the likely magnitude of the acquisitions.

Hydrogeology, Hydrochemistry, and Groundwater Transport Studies, Wadi Ibrahim, Saudi Arabia

Saudi Geological Survey, Mecca Valley, Saudi Arabia 2010 - 2012

On contract to the Saudi Geological Survey, Dr. McCord served as project manager and principal hydrogeologist for a study of Wadi Ibrahim hydrogeochemistry and isotope hydrology Study. Specific tasks included evaluation of aquifer hydrochemistry and geochemistry include isotope chemistry, recharge sources and rates, hydraulic properties, flow path characterization, and design and execution of single- and multi-well tracer tests for aquifer transport characteristics.

Hydrology and Water Resources of Lower Pecos River Basin, New Mexico

New Mexico Interstate Stream Commission, 2000- 2008

Served as Project Manager and lead hydrologist for several New Mexico Interstate Stream Commission (ISC) studies related to water management issues on the lower Pecos River. Tasks included: Representing ISC on the NEPA team Hydrology Work Group for developing an EIS for re-operations of Pecos River projects; develop and apply linked surface water – groundwater hydrologic model to support adjudication settlement discussions for the lower Pecos River; analysis of seepage losses from Carlsbad Irrigation District main canal; disaggregated unidentified losses from Brantley Reservoir into three components: seepage/bank storage, submerged spring inflow, and ungaged tributary inflows.

Impacts of Coalbed Methane Development on Connected Groundwater Systems, Southern Colorado

Public Counsel of the Rockies, Huerfano and Archuleta Counties, Colorado, 2008-2011

Assessed impairment to existing water rights due to Coal-bed Methane (CBM) development in northern San Juan Basin, La Plata and Archuleta counties, and northern Raton Basin, Huerfano County, Colorado. Performed hydrogeologic evaluations and submitted expert witness documents (including affidavits in Colorado District Court, Water Division 7 and Colorado Supreme Court, Vance vs Wolfe, SEO). Included in project tasks was development of a groundwater flow model for the northern Raton Basin in Colorado and critical evaluation of groundwater models developed by energy production companies in San Juan Basin in southwest Colorado. Provided testimony in hearing before Colorado State Engineer on potential impacts of CBM development on connected surface water rights.

Isleta Pueblo Water Resources and Hydrology Expert, New Mexico

Isleta Pueblo, New Mexico, 2007 - 2011

Dr. McCord served as hydrology expert for the Pueblo of Isleta (New Mexico) addressed a variety of technical tasks including surface water and groundwater interactions in support of Rio Grande riverine habitat restoration, and evaluation of injury to Pueblo water rights due to ag to municipal transfers.

Stream – Aquifer Interactions along San Acacia – San Marcial Reach of the Middle Rio Grande

US Bureau of Reclamation, Socorro County, New Mexico, 2000-2001

Project Manager for study funded by US Bureau of Reclamation looking at surface water – groundwater interaction along the San Acacia to San Marcial Reach of Rio Grande, New Mexico. Utilizing a variety of historical data collected as early as the 1960s, Dr. McCord's analysis supported refinement of the hydrogeologic conceptual model for the reach, identified losing and gaining sub-reaches, and quantified the gains and losses (and their variability). This understanding is critical for evaluating management alternatives for this reach of the Rio Grande.

Mining Projects

Analysis of Seepage, Las Bambas Mine Waste Rock Facilities, Apurimac, Peru

Working with DHI under contract to Mining & Minerals Group (MMG), Dr. McCord is leading the effort in detailed seepage analysis. Tasks undertaken in this effort include review and compilation of waste rock materials properties, climate data analysis, and development and application of a numerical model of long-term seepage (including matrix and macropore flow) for the waste rock facility. Dr. McCord's waste rock facility seepage analyses modeling results will be used as input for the regional groundwater flow model developed in FEFLOW.

Peer Review of Hydrogeologic Flow Model, Vega Sapunta, Pampa Puno Mine, Chile

Under contract to CODELCO and working with Ausenco hydrogeologists, Dr. McCord served as senior consultant and reviewer of detailed 3D regional hydrogeologic flow model (developed in MODFLOW-USG) of the Cerro Leon and Quebrada Yocas basins that converge and feed the Vega Sapunta wetlands, a protected ecological zone. The model had been developed specific ally to evaluate impacts of well fields located upgradient of the wetlands that supply water for the Pampa Puno mine.

Analysis of Seepage, Zafranal Waste Rock and Tailings Management Facilities, Arequipa, Peru

Under contract to Teck, Dr. McCord led the effort in detailed seepage analysis. Tasks undertaken in this effort included development of a TMF conceptual model for seepage development, and development and application of a numerical model of draindown seepage from the TMF and another for long-term seepage (including matrix and macropore flow) for the waste rock facility. Dr. McCord's TMF and Waste Rock Dump modeling results were used as input for the regional model developed in FEFLOW.

Analysis of Waste Rock Seepage, Antapaccay – Tintaya Mines, Cusco, Peru

Under contract to DHI, Dr. McCord led the effort in detailed seepage analysis. Tasks undertaken in this effort included development and application of a hybrid analytical - numerical model for long-term seepage (including matrix and macropore flow) for the waste rock facility and working closely with regional modeling team (FEFLOW) to ensure consistency between the two modeling efforts.

Analysis of Seepage, Antamina Waste Rock Dump, Ancash, Peru

Working with GeoSystems Analysis scientists under contract to Antamina, Dr. McCord led the effort in detailed seepage analysis for the East Waste Rock Dump. The effort included compilation and integration of more than a decade's worth of monitoring and experimental data generated by the client since 2009, and synthesized the data to support development and application of a transient water balance model for the waste rock facility. The results of this model will be used to support mine closure engineering and water management.

Analysis of Seepage, Candelaria Mine, Chile

For an EIA in support of expansion of the Candelaria project, Dr. McCord performed detailed seepage analysis, which included development and application of a numerical model for long-term seepage for the waste rock facility. For the tailings management facility, Dr. McCord supported the FEFLOW team in the development and application of post-operations draindown modeling embedded within the regional model.

Analysis of Seepage, Drystack Tailings Facility, Rosemont Mine, Arizona

In support of mine planning for the planned Hudbay drystack tailings facility (DTF) at the Rosemont Mine in Arizona, Dr. McCord played a senior consultant role in the development of a hydrologic conceptual model for seepage development in the DTF, design and execution of a laboratory characterization program for the drystack tailing materials, analysis of geotechnical and soil-physical properties from the laboratory test results, and development and application of a numerical model of seepage and subsurface flow, with the objective to project long-term seepage rates from the facility.

Lagunas Norte Project (Barrick Gold), Water Resources Lead for Modification to EIA, Peru

Under contract to Barrick Gold, Dr. McCord led the water resources effort for the EIA study for the Lagunas Norte project expansion, and supported the mine operations team by evaluating the ability of the pit dewatering activity to provide the supply required for the mine expansion. For the water resource activity, particular tasks performed by AMEC included: compilation of historical hydrology and hydrogeology data, and development of a GoldSim water balance and water quality model, and a three-dimensional numerical model of groundwater flow for the mine area.

Stage 2 Investigation and Contaminated Groundwater Abatement Plan, Tyrone Mine, New Mexico, USA

Under contract to Freeport McMoran Tyrone mine, Dr. McCord served as a senior consultant on a Stage 2 investigation and detailed design for perched groundwater in Oak Grove Wash / Brick Kiln Gulch (OGW/BKG), which has been contaminated by acid drainage associated with the mine operations. As part of implementing these measures, site investigation and conceptual design activities in OGW/BKG had previously been completed, and the objective of this project was to conduct site investigation services to support design and construction of a keyed-in, low-permeability barrier and alluvial (perched) groundwater collection system to collect impacted water which flows to and through OGW/BKG and will accumulate up-gradient of the proposed low-permeability barrier. Data from this site investigation is beinge used to design the Stage 2 abatement measures for perched groundwater in OGW/BKG.

Fruta del Norte Project Water Resources Coordinator for Feasibility Study, Ecuador

Under contract to Lundin Gold, Dr. McCord supported the feasibility study for this gold mine, in the “ceja de selva” (edge of the jungle) in southeast Ecuador. For this project, he led the water resource studies for the project, coordinating activities among AMEC staff and subcontractors who performed the hydrogeologic and surface hydrology characterization and modeling efforts, and played a key role in development of mine water management strategies.

Pampa de Pongo Project Water Resources Lead for EIA, Peru

Under contract to Jinzhao Mining Company, AMEC performed the EIA study for the Pampa de Pongo Project, located near the coast in the Department of Arequipa in southern Peru. For this project, Dr. McCord led the water resource studies for the project, and supported the geotechnical analysis of the of pit wall stability for the feasibility study. For the water resource activity, particular tasks performed by AMEC included hydrology and hydrogeology field characterization, core drilling, and borehole hydraulic testing; site surface hydrology, meteorology, and project area water balance; and estimation of open pit water inflows using analytical and numerical models.

Analysis of Seepage, San Nicolas Waste Rock and Tailings Management Facilities, Zacatecas, Mexico

Under contract to Teck, Dr. McCord led the effort in detailed seepage analysis, which included development and application of a numerical model of draindown seepage from the TMF and another for long-term seepage (including matrix and macropore flow) for the waste rock facility. The results of these models were used as part of the upper boundary condition for the regional flow model developed in FEFLOW.

Studies and Engineering, Sustainable Management of Tailings, Minera Doña Inés de Collahuasi, Chile

Provided services in disciplines of hydrogeology and acid drainage. Preparation Analysis of Relevance and PAS 135, 137 and 155. Oversight Activities of soil sampling, QA/QC control of soil analysis, and acid mine drainage determination, updated hydrogeologic conceptual and numerical model of seepage and contaminant transport.

Analysis of Seepage and Acid Drainage, Quillayes –El Chinche Tailings Facility, Los Pelambres Mine

In support of closure planning for this tailings facility, AMEC is performing a detailed hydrogeological study, tasks have include sampling activities of tailings and water, QA/QC control of analysis of tailings and water samples, water quality assessment and geochemical modeling of water quality, installation of piezoemters, development of a hydrogeological conceptual model, and development and application of a numerical model of seepage, subsurface flow, and contaminant transport.

Antamina Mine Project Regional Hydrogeologic Integration and Hydrogeologic Geodatabase

Under contract to Antamina, Dr. McCord served as project manager for AMEC team charged with integrating all hydrogeologic data collected since site inception into an ArcGIS geodatabase, and compiling a hydrogeologic integration report, as well as developing three- and four-dimensional data visualizations. The hydrogeologic integration report involved summarizing all past work, with a particular focus on site studies undertaken since 2008, identifying important data gaps, and developing a site-wide integrated hydrogeologic conceptual model that could be used to provide a framework for interpreting existing and newly acquired site data.

La Granja Project Water Resources Lead for Prefeasibility Study, Peru

Under contract to Rio Tinto Mining Company, AMEC performed the prefeasibility study for the”starter case” for the La Granja Mine Project, located in the Department of Cajamarca in northern Peru. For this project, Dr. McCord led the water resource studies for the project, and supported the analysis of the heapleach planning task. For the water resource task, Dr. McCord coordinated activities among AMEC staff and subcontractors who performed the hydrogeologic and surface

hydrology characterization and modeling efforts, and played a key role in development of mine water management strategies.

Carmen de Andacollo Project – Hydrogeologic Analyses in Support of Tailings Facility Expansion, Chile

On contract to Compania Minera TECK, AMEC is providing hydrogeological characterization and analyses in support of expansion of the mine tailing facilities. As part of this effort Dr. McCord is providing senior review and consulting to the AMEC E&I team in Santiago involved in data analysis, field characterization, and hydrogeological modeling.

Mina Huaron and Mina Morococha, Water Resources Management and Compliance with LMP and ECA Water Quality Standards

Under contract to Pan American Silver Corporation, AMEC led efforts to characterize mining project water management and discharges to evaluate current conditions and develop water management and treatment plans to ensure compliance with the new Peruvian LMP (Limitacion Maximum Permisible, basically end-of-pipe discharge) and ECA (Estandard de Calidad Ambiental, basically river standards at locations downstream from end-of-pipe discharges) for the Huaron and Morococha mines in the Peruvian Andes. Dr. McCord led the water management team, involved in analysis of existing data and development of water management models for evaluation of alternatives to ensure compliance with new standards. Treatment alternatives considered included standard mine water treatment plants, innovative water recycling and management schemes, and constructed wetlands and permeable reactive barriers.

Ollachea Mine Project Hydrology and Hydrogeology for Prefeasibility and Feasibility Studies, Peru

Under contract to IRL / Compania Minera Kuri Kullu, Dr. McCord performed project management, model development, and senior review tasks for the hydrology and hydrogeology activities for the project pre-feasibility study. Particular tasks performed by AMEC hydrology and hydrogeology team included: field characterization, core drilling, and borehole hydraulic testing; site surface hydrology, meteorology, and project area water balance; and estimation of underground mine tunnel inflows using analytical and numerical models (MODFLOW-USG).

Hydrogeological Modeling of the Limestone Quarries, Toromocho Project, Peru

As part of mine development studies for Minera Chinalco Perú S.A., AMEC constructed a groundwater flow model to evaluate likely timing that seepage from the tailings facility would begin flowing into the limestone quarry. Dr McCord served a project manager of this effort which involved staff from US and Peru office. The project was performed on a very accelerated schedule to address concerns that arose during the facility permitting process, and utilized the limited available data from the quarry area to generate a numerical model suitable for addressing questions raised by government regulators.

Quechua Mine Water Balance, Peru

For Compañía Minera Quechua performed senior review for the development of a comprehensive water balance of the Proyecto Minero Quechua mine during the operating phase. Water balances for the construction and closure phases are currently under development.

Tyrone Mine Pit Lake Model for Closure Plan, New Mexico

Senior reviewer for hydrogeology team in development of pit lake model to address a variety of issues, including estimating the post-closure recovery period of water levels in the mine pits and surrounding aquifers, and project the post-closure steady-state pit lake(s) surface elevation(s), examining the potential for pit lake outflows, and evaluating the potential interactions of pit lake(s) with other mine facilities, hydrologic features, and geologic structures.

Radionuclide Transport Modeling, Uranium Milling Facility, Western US

Groundwater expert responsible for the development and application of flow and transport models to evaluate historical radionuclide concentrations in groundwater. The results of our analysis were used for exposure assessments for off-site individuals via the drinking water and foodchain pathways as part of a toxic tort suit.

Corani Mine, Water Resources Lead for EIA, Peru

Under contract to Bear Creek Mining Company, Dr. McCord performed project management, oversaw model development, and senior review tasks for the hydrology and hydrogeology, and water resource management tasks for the project EIA study. Utilizing existing data supplemented by AMEC-collected data on site hydrology, hydrogeologic measurements and mapping, and water quality sampling team, developed linked surface water and regional groundwater models, and project area water balance to provide EIA impact analysis for water resources.

Unsaturated Flow and Transport Analysis of Heap Leach Operations

Developed a conceptual model for heterogeneous distribution of hydraulic properties within a heapleach pad for the Tyrone Mine in southwest New Mexico. Based on the conceptual model, constructed and applied a variability saturated flow and transport model to evaluate the potential for channeling and flow bypass at various surface application rates, and leaching efficiency as a function of application rates.

Environmental Contamination / Remediation Projects

Tuba City Landfill Contamination Site, Tuba City, Arizona

Under contract to the US Bureau of Indian affairs, Dr. McCord served as senior reviewer and consultant for the Tuba City Landfill Remediation Feasibility Study, AZ to develop groundwater flow and transport models to evaluate sources of uranium contamination and potential remediation alternatives.

CSX Railroad, Papa John's Stadium Contamination Plume Remediation, Louisville, Kentucky

Senior reviewer and consultant for development of models to estimate the total, mobile, and recoverable volumes and natural source zone depletion of a 20+ acre LNAPL plume in Louisville, KY. MODFLOW-SURFACT was employed to simulate reactive transport in an active water phase (both saturated and unsaturated flow) with interaction and interphase transfer with a static separate LNAPL phase. Developed remedial strategies to pinpoint locations of the project site amenable to recovery; as well as to define the areas of the site where recovery is technically impractical with use of more innovative enhanced bioremediation approaches to effective management of the LNAPL plume.

Williams Air Force Base LNAPL Plume Remediation, Arizona

Senior reviewer and consultant for development of models to estimate the natural and enhanced bioremediation depletion of a jet fuel and aviation gas release at Williams Air Force Base, AZ. The water table at this site has risen some 90 feet creating an uncharacteristically deep LNAPL residual in the site aquifers. MODFLOW-SURFACT was used to predict the fate of residual LNAPL and dissolved phase contamination following aggressive, steam-flushing recovery operations at the site.

Redlands Toxic Tort Litigation, California,

Served as methodology expert in evaluation of contaminant transport through the vadose zone. Contaminants included organic solvents disposed of from industrial and manufacturing facilities.

Rocky Mountain Arsenal, Natural Resources Damage Claim by State of Colorado

As the groundwater expert to the Colorado Office of Attorney General, Dr. McCord worked with interdisciplinary team to assess and quantify injury to groundwater resources and water supply impairment due to historical site operations at the Rocky Mountain Arsenal, CO, as part of a Natural Resources Damage Claim by the state. Tasks involved review and analysis of historical site data, as well as development and application of a regional groundwater flow model.

Spartan Site, DNAPL Contamination Plume, Albuquerque West Mesa, New Mexico

Project Manager and groundwater expert on a case which involved subsurface contamination by DNAPL at an industrial site on Albuquerque's west mesa, NM. Evaluated observed contaminant plumes (water and gas phases) for current and historical conditions in both the vadose and saturated zones. Considered impacts of municipal well pumping and a nearby irrigation ditch system on the dynamics of the fate and transport processes. Prepared expert report and was involved in technical aspects of the settlement negotiations.

Site Wide Hydrogeological Characterization Project, Sandia National Laboratories, New Mexico

Project Manager for Sandia National Laboratory (SNL) Site Wide Hydrogeologic Characterization Project. Development and testing of surface and subsurface hydrologic conceptual models for environmental restoration sites at the 200 square mile SNL region. Annual reports, regional groundwater characterization and monitoring wells, definition and characterization of representative vadose zone settings across the region, and characterization and monitoring of the site-wide surface water system.

Evaluation of Greater Confinement Disposal of Radioactive Water, Dept of Energy, Nevada

Development and application of vadose zone hydrologic models to project radionuclide migration rates associated with disposal of low-level and "orphan waste" to be disposed of in the Greater Confinement Disposal Test located on the Nevada Test Site in southern Nevada.

International Paper Groundwater Contamination Insurance Recovery

Project Manager and groundwater expert in major insurance recovery case involving five separate wood treating plant facilities across the country (LA. TX, MO, CA and WA). Development of contaminant histories based on plant records (going back to the early 20th century), site specific data and contaminant fate and transport modeling.

Waste Isolation Pilot Plant, Southeast New Mexico

Supported the development of a regional MODFLOW model used to define groundwater in the vicinity of the Waste Isolation Pilot Plant (WIPP), NM site, and application of the SECO performance assessment model to evaluate potential radionuclide releases over a 10,000-year performance period. Provided written and oral rationales for groundwater transport parameters to EPA and National Academy of Science technical review panels, and developed QA records for the WIPP license application.

Expert Witness

- 2019, General Adjudication of All Rights to Use Water in the Little Colorado River System, Civil Case No. 6417-203, Apache County Superior Court, The State Of Arizona. *Trial testimony* on behalf of the Navajo Nation, as expert in trial Phase II, Hopi Water Claims, focus on historical water resource availability, surface water modeling, and water use and depletion for agricultural and irrigation purposes. Phase II court ruling in 2019 favorable to Navajo
- 2018, General Adjudication of All Rights to Use Water in the Little Colorado River System, Civil Case No. 6417-203, Apache County Superior Court, The State Of Arizona. Filing of expert report and subsequent *deposition testimony* on contract to the Navajo Nation Department of Justice. Court-accepted expert in historical water resource availability, surface water model and water depletion analysis, and water use for agricultural irrigation purposes.
- 2012, Steadfast Insurance Company et al. vs. Terracon, Inc., et al., Colorado. Retained as plaintiffs groundwater hydrology expert, Dr. McCord served on a multidisciplinary team of hydrologists, geologists, and civil and geotechnical engineers for a large construction defects insurance recovery case. Contributed expert reports, technical exhibits to support mediation efforts, and *deposition testimony*. Case settled in August 2012 (Client: Zurich Insurance).
- 2009, Colorado State Engineer, CBM Produced Water Nontributary Rulemaking Hearing, Groundwater expert for Public Counsel of the Rockies, *testified at SEO rule-making hearing* on technical review of northern San Juan Basin groundwater model produced by CBM industry consultants (Client: Public Counsel of the Rockies).
- 2009, Isleta Pueblo vs Santa Fe Water Resource Alliance, NEW MEXICO Office of the State Engineer File No. SD-04729 & RG-74141 into SP-4842, Hearing No. 07-059. Expert reports filed and hearing testimony related to hydrologic impact of surface water transfers that moved point of diversion (and depletion) along the Rio Grande from south of Isleta Pueblo to north of Isleta Pueblo, cases settle (Client: Pueblo of Isleta).
- 2007, Vance et al vs Wolfe (Colorado State Engineer) et al. Colorado Water Court Division 7, Case No. 05CW63. Plaintiffs' hydrology expert in case to determine jurisdiction of Colorado State Engineer to adopt permitting requirements for coalbed methane wells that may be impacting plaintiffs' decreed water rights. Plaintiffs prevailed in Water Court, and case was appealed to the Colorado Supreme Court, which in 2009 affirmed the lower court ruling (see http://www.westernwaterlaw.com/articles/Vance_v_Wolfe.html).
- 2007, Sierra Club and Mineral Policy Center vs. El Paso Gold Mine, Civil Action 01-PC-2163, Federal District Court of Colorado. *Trial testimony* as groundwater flow and transport methodology expert. (Client: John Barth, Attorney-at-Law)
- 2006, Low Line Ditch Well Users, An Application For Water Rights And Approval Of Plan For Augmentation, Colorado District Court, Water Division No. 1 Case NO. 2003CW094. *Deposition testimony* in October 2006 on impacts of groundwater pumping aspects of water rights application on senior water rights holder, case settled. (client: City of Boulder, CO; Moses, Wittemyer, Harrison, and Woodruff, P.C.)
- 2006, Dinsdale Brothers, Inc Well Users, An Application For Water Rights And Approval Of Plan For Augmentation, Colorado District Court Case Nos. 2001CW061 and 2003CW194:, Water Division No. 1. Deposition testimony in

September 2006 on impacts of groundwater pumping aspects of water rights application on senior water rights holder, case settled. (client: City of Boulder, CO; Moses, Wittemyer, Harrison, and Woodruff, P.C.)

- 2006, Allen et al. vs. Aerojet General et al., Superior Court of the State of California, County of Sacramento, Consolidated Case No. RCV 31496. *Jury trial testimony* in March 2006 regarding the evaluation of historical groundwater contamination at Aerojet Rancho Cordova Plant. Case Phase I (defendant negligence) ruled in client favor, Phase 2 (damages) settled for undisclosed sum (client: Engstrom, Lipscomb & Lack)
- 2006, Well Augmentation Subdistrict of Central Colorado Water Conservancy District, Water Rights Application and Augmentation Plan, Colorado District Court, Water Division No. 1. Deposition testimony in March 2006 on impacts of groundwater pumping aspects of water rights application on senior water rights holder, case settled. (client: City of Boulder, CO; Moses, Wittemyer, Harrison, and Woodruff, P.C.)

Reports & Publications

Textbooks

Selker, J.S., C.K. Keller, and J.T. McCord, 1999. Vadose Zone Processes, Lewis / CRC Press, Boca Raton, FLA, 339 pp.

McCord, J.T., and J.S. Selker, 2003. Transport Phenomena and Vulnerability of the Unsaturated Zone, in Encyclopedia of Life Support Systems, UNESCO, www.eolss.net.

Refereed Journal Articles

McCord, J.T., C.A. Gotway, and S.H. Conrad. 1997. Impact of geological heterogeneities on recharge estimation using environmental tracers. Water Resources Research, 33(6):1229-1240.

Goodrich, M.T. and J.T. McCord. 1995. Quantification of uncertainty in exposure assessments of hazardous waste sites. Ground Water, 33(5):727-732.

Eaton, R.R. and J.T. McCord. 1995. Monte Carlo stochastic analysis of effective conductivities for unsaturated flow. Transport in Porous Media, 18(3).

McCord, J.T. 1991. On the application of second-type boundaries in modeling unsaturated flow. Water Resources Research, 27(12):3257-3260.

McCord, J.T., J.L. Wilson, and D.B. Stephens. 1991. The importance of hysteresis and state-dependent anisotropy in modeling flow through variably saturated soils. Water Resources Research, 27(7):1501-1518.

McCord, J.T., D.B. Stephens, and J.L. Wilson. 1991. Toward validating macroscopic state-dependent anisotropy in unsaturated soils: Field experiments and modeling considerations. Journal of Contaminant Hydrology, 7:145-175.

McCord, J.T. and D.B. Stephens. 1988. Comment on `Effective and relative permeabilities of anisotropic porous media' by Jacob Bear, Carol Braester, and Pascal Menier. Transport in Porous Media, 3:207-210.

McCord, J.T. and D.B. Stephens. 1987. Comment on `Effect of ground-water recharge on configuration of the water table beneath sand dunes and on seepage in lakes in the Sandhills of Nebraska, USA' by Thomas C. Winter. Journal of Hydrology, 95:365-367.

McCord, J.T. and D.B. Stephens. 1987. Lateral moisture flow beneath a sandy hillslope without an apparent impeding layer. Hydrological Processes, 1(3):225-238.

Conference and Symposia Proceedings

McCord, J.T., S. Sigstedt, S. Gangopadhyay, and R. Uribe, 2018. Stream Depletion Factors, Unit Response Functions, and streambed properties for modeling lagged river depletions due to well pumping, Western Groundwater Summit, Groundwater Resources Association of California, September 2018.

McCord, J.T., and S. Gangopadhyay, 2016. Stochastic numerical analysis of up-scaled aquifer and streambed properties for modeling lagged river depletions due to well pumping, Geological Society of America Annual Meeting, 25-28 Sept 2016, Denver, CO.

McCord, J.T., D.B. Stephens, and T.C. Jim Yeh, 2016. Moisture dependent anisotropy in unsaturated flow: theory and application, Geological Society of America Annual Meeting, 25-28 Sept 2016, Denver, CO.

McCord, J.T., J.A. Clark, N. Starr, R. McGregor, and N. Mandic, 2010. Applied Telescopic Mesh Refinement in Groundwater Modeling: Three Case Studies, NGWA National Groundwater Modeling Summit, Denver, CO, April 11-15.

Gangopadhyay, S., J.T. McCord, and S. Musleh, 2007. A Combined Stochastic-Deterministic Approach to Estimating Effective Streambed and Aquifer Properties and Lagged River Depletions due to Alluvial Well Pumping, Symposium on River, Floodplain, and Terrace Hydrology, New Mexico State University, Las Cruces, NM, Feb 28 – Mar 1, 2007.

Carron, J.C., J.T. McCord, A. Elhassan, P. Barroll, T. Stockton, and M. Rocha, 2006. Pecos River Decision Support System: Tools for Managing Conjunctive Use of Surface and Groundwater Resources, US Committee on Irrigation and Drainage Water Management Conference, October 25-28, Boise, Idaho.

Hall, L.M., J.T. McCord, and J.L. Smith, 2006. Pumping Tests Designed for Investigating Surface Water – Groundwater Interactions Along the Lower South Platte River, Northeast Colorado, NM Water Research Symposium, New Mexico Water Resources Research Institute, August 15, 2006.

Dr. McCord has more than 75 additional conference presentations and publications on a range of water resource topics dating back to 1985, and a list of those can be provided upon request.

EXHIBIT 2

COVINGTON & BURLING LLP

September 23, 2021

Memorandum

To: Marshall Miller and Courtney E. Taylor

From: Kevin Poloncarz

Re: The Need for Further Environmental Review of the Proposed Canna Rios Project

I. Background

Applicant Canna Rios, LLC applied for a land use permit (19LUP-00000-00116) for a cannabis cultivation operation in Santa Maria, California (APN 129-040-010) (the "Project"). The Project will be located in northwest Santa Barbara County, adjacent to the San Luis Obispo County border.

Application materials suggest that the Project will involve growing, harvesting, and on-site freezing and packaging of cannabis. The Project has been described, in relevant part, as:

> [A] request for approval of a Land Use Permit to allow approximately 46.73 acres of outdoor cannabis cultivation and approximately 1.45 acres of cannabis nursery. . . The operation will involve 2 harvests per year for a duration of approximately 3 weeks per harvest, not to exceed 4 weeks per harvest. Approximately 1/3 of harvested cannabis will be immediately flash frozen and approximately 2/3 of harvested cannabis will be immediately packaged in the field; all harvested cannabis will be transferred offsite for processing the same day it is harvested.

Conditions of Approval, Case No. 19LUP-00000-00116, ¶1.

The County Planning Commission has explained that the Project is within the scope of the county's previously certified Programmatic Environmental Impact Report ("PEIR") pursuant to the California Environmental Quality Act ("CEQA"). *See* May 7, 2021 letter RE: Appeal of Canna Rios, LLC Cannabis Cultivation Land Use Permit; 21APL-00000-00007, 21APL-00000-0008, Attachment A: Findings, §1.1. The Commission found "the Project will not create any new significant effects or a substantial increase in the severity of previously identified significant effects on the environment, and there is no new information of substantial importance under State CEQA Guidelines Section 15162 warranting the preparation of a new environmental document for the Project." *Id.*

Appellants Bien Nacido Vineyards *et al.* respectfully disagree with this conclusion.

II. Additional Environmental Review is Necessary Under CEQA

Both the paucity of analysis in the PEIR relating to the Project's specific, foreseeable environmental impacts, and several changed circumstances since the PEIR's certification demand further environmental review under CEQA.

As a threshold matter, the drafters of the PEIR explicitly noted the PEIR's inherent inability to address site-specific impacts of future cannabis activities such as the Project. The PEIR provides, in relevant part: "[a]s a Program EIR, the level of detail included in the project description and methodology for impact analysis is relatively more general than a project-level EIR, as individual cannabis activity site-level details are not available for prospective license applications or would be considered too speculative for evaluation." PEIR at ES-1. Elsewhere, the PEIR explains that CEQA requires further environmental review for any of these site-specific effects that were not addressed in the PEIR: "In accordance with the State CEQA Guidelines Section 15168(c), if subsequent cannabis site development would have effects that were not examined in the EIR, further CEQA review would be required to determine site-specific impacts, determined on a case-by-case basis, and in accordance with the use permit or development plan process applicable to the subject site." PEIR at 1-5.

Here, consistent with the PEIR's summary of the CEQA process, further environmental review is necessary and the failure to conduct such analysis in association with the Project is inconsistent with CEQA and unlawful. While the county completed a "checklist" concerning the Project pursuant to Section 15168 of the CEQA Guidelines, that checklist fails to examine the Project's foreseeable environmental impacts, specifically its potential to contribute to significant air quality and climate change impacts. Instead, the checklist refers back to the PEIR as an adequate examination into the Project's potential impacts. This conclusion overlooks gaps in the PEIR itself, as well as new information and changed circumstances since the PEIR was certified.

Section 15168 of the CEQA Guidelines describes programmatic EIRs. It provides that a PEIR is only an acceptable stand-in for a project-specific EIR to the extent it addresses future impacts both specifically and comprehensively. *See* Cal. Code Regs. tit. 14, § 15168(c)(5). It further explains that, even when an agency has published a PEIR, the agency must consider whether projects or activities are adequately addressed by that PEIR, and, if they are not, then further project-specific environmental analysis is required. "If a later activity would have effects that were not examined in the program EIR, a new initial study would need to be prepared leading to either an EIR or a negative declaration." *Id.* at § 15168(c)(1).

Section 15168 also contains a cross-reference to Section 15162, which explains when additional environmental review is necessary. Under Section 15162 an agency is required to undertake additional environmental review when "[s]ubstantial changes occur with respect to the circumstances under which the project is undertaken which will require major revisions of the previous EIR or negative declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects;" or "[n]ew information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR was certified as complete" comes to light. In this instance, the Project involves both substantially changed circumstances and new information of substantial importance, both of which require supplemental environmental review. *Id.* at §§ 15162(a)(2)–(3). Further environmental review is

therefore necessary to specifically address two potential types of emissions impacts that are not considered by the PEIR.

First, the PEIR fails to consider the impact that biogenic volatile organic compounds ("VOCs") emitted from commercial cultivation of cannabis plants have on nonattainment with state and federal standards for ground-level ozone. While scientific studies indicate that biogenic VOCs from cannabis may also contribute to particulate matter and toxic air pollution, ozone is a pollutant of increasing local concern: Since certification of the PEIR, the portion of San Luis Obispo County lying *literally at the northern boundary of the Project site* has been designated by the U.S. Environmental Protection Agency ("EPA") as nonattainment for the 2015 National Ambient Air Quality Standard ("NAAQS") for ozone under the Clean Air Act; and the California Air Resources Board ("CARB") recently downgraded Santa Barbara County's designation for the state ozone standard from "attainment" to "nonattainment."

New studies published since the time the PEIR was certified indicate that biogenic VOC emissions from commercial cannabis cultivation can contribute to ozone and other air pollution. Yet the PEIR's discussion of the impact that commercial cannabis operation might have on attainment of state and federal air quality standards focuses solely on emissions of VOCs and other pollutants *from combustion of fuels in mobile sources and agricultural equipment*; it fails to give any consideration to the role that biogenic VOCs from cannabis cultivation may have on ozone pollution levels in either Santa Barbara County or San Luis Obispo County. The Project-specific checklist also fails to include any such discussion.

While the PEIR and Project checklist assessed odor impacts attributable to commercial cannabis cultivation, they completely ignored the more significant public health impacts associated with how biogenic VOC emissions from commercial cannabis cultivation throughout the County and from this Project will contribute to ongoing violations of state and federal air quality standards and generate significant toxic air pollution. Moreover, neither document gave any consideration to the impacts that emissions from commercial cannabis cultivation have in San Luis Obispo County, which is literally at the Project's property line and has since been designated nonattainment for the more stringent 2015 ozone NAAQS.

In short, new information of substantial importance that was not available at the time of the PEIR's certification has become available that shows that the Project's air quality impacts will be significantly greater and more severe than considered by the PEIR. This includes: (i) new scientific studies indicating that biogenic VOCs from cannabis cultivation contribute to ozone pollution; (ii) the fact that the adjacent County, which is located literally at the property line, has since been designated as nonattainment for the more stringent federal ozone standard; and (iii) the fact that Santa Barbara County has since been downgraded back to nonattainment with the state ozone standard. Unless and until the County conducts additional review to consider how the Project's emissions of biogenic VOCs will contribute to violation of state and federal ozone standards in Santa Barbara County and the federal nonattainment area immediately adjacent to the Project site, the requirements of CEQA have not been met and the Project's approval is unlawful.

Second, the PEIR fails to adequately consider hydrofluorocarbon ("HFC") emissions associated with the Project's freezing operations. Other than defining what HFCs are and how they contribute to climate change, the PEIR fails to acknowledge that commercial cannabis cultivation could result in HFC emissions or to consider how HFCs from refrigeration and freezing operations

associated with such cultivation contribute to global warming. The Project-specific checklist fails to provide any additional analysis beyond the PEIR, despite the fact that this Project will involve some type of freezer, albeit undefined or conditioned, and refrigerants are the leading source of HFC emissions.

Globally, HFCs are the fastest growing source of greenhouse gas ("GHG") emissions that contribute to climate change, with a global warming potential, on a pound for pound basis, thousands of times greater than carbon dioxide (CO_2). Accordingly, scientists, lawmakers, and government agencies have increasingly turned their focus to aggressively reducing HFC emissions. Because the PEIR failed to consider impacts associated with use of HFCs in refrigeration and in light of the increasing state and federal emphasis on reducing HFCs due to the available of new low global warming-potential substitutes, the County should have performed additional environmental review of the Project to assess the impacts associated with use of refrigerants in its freezing operations.

A. The Project's Contribution to Nonattainment with State and Federal Ozone Standards Has Not Been Assessed

1. Cannabis cultivation emits considerable quantities of biogenic ozone-precursor VOCs, which are now understood to impact ozone pollution

The Clean Air Act requires the EPA to set National Ambient Air Quality Standards ("NAAQS") for six key "criteria" pollutants.[1] These standards provide maximum acceptable levels for each of the pollutants. When a region's air quality fails to achieve the standards, that area is designated by EPA as a "nonattainment" area.[2] Likewise, in California, CARB has issued its own standards for criteria pollutants and designates areas as either attaining or not attaining CARB's standards, which often provide for different acceptable levels of pollution than the federal NAAQS.[3] Nonattainment areas must work toward attainment with either the federal or state ambient air quality standards (or both), and new or modified pollution sources within such areas are subject to greater scrutiny because of the need to minimize or completely offset further contributions to nonattainment.

Ozone is one of the federal criteria pollutants and is thus subject to a NAAQS.[4] Yet, unlike some other criteria pollutants, ozone is not emitted directly into the air, instead, it is produced when various precursor pollutants—VOCs and oxides of nitrogen ("NOx")—combine in the atmosphere

---

[1] *See* 42 U.S.C.A. §§7408–7409.

[2] *See* US EPA. Air Quality Designations for Ozone. https://www.epa.gov/ozone-designations (last accessed Sept. 17, 2021).

[3] *See* California Air Resources Board. Air Quality Designations for Ozone. https://ww2.arb.ca.gov/resources/fact-sheets/air-quality-standards-ozone (last accessed Sept. 17, 2021).

[4] US EPA. Criteria Air Pollutants. https://www.epa.gov/criteria-air-pollutants (last accessed Sept. 17, 2021).

in the presence of sunlight. Consequently, these precursor pollutants are regulated and must be considered in any plan to monitor and mitigate ozone nonattainment.[5]

The cannabis industry is a significant source of VOCs. While many plants emit VOCs, cannabis plants are now known to emit enough VOCs to "negatively affect regional air quality."[6] Different strains of cannabis emit different levels and types of VOCs, and the amount of emissions varies depending on differences in strain, maturity, and cultivation and processing methods. The impact that cannabis-produced VOCs have on ozone pollution also depends on regionally variable factors, like the amount of NOx present in the atmosphere. Jurisdictions that have been early adopters of legal cannabis cultivation have also been actively involved in ensuring that the industry does not exacerbate air quality problems. Denver, for example, recognizes that biogenic VOCs from cannabis plants "contribute to ground level ozone" and that it is "important that the cannabis industry mitigate VOC emissions."[7]

2. The PEIR's analysis of ozone pollution fails to consider the impacts from biogenic VOC emissions

As a threshold matter, the PEIR acknowledges the inherent limits to sufficiently analyzing emissions impacts at a programmatic level. The PEIR explains that "[g]iven the programmatic nature of the Project and the inability to effectively predict or anticipate the location and extent to which cannabis activities would operate, it is difficult to assess the impacts that the Project would result with regard to operational long-term emissions." PEIR at 3.3-20.

Moreover, while the PEIR generally recognizes that VOCs contribute to ozone formation, the PEIR's consideration of ozone and VOCs focuses only on combustion-related emissions—*not* biogenic VOC emissions from the cultivation and processing of cannabis itself. And although the PEIR mentions potential *odor* issues caused by terpenes (which are a category of biogenic VOCs), it does not assess the role these powerful compounds play in ozone formation. *See* PEIR at 3.3-7. Indeed, the PEIR describes reactive organic gases ("ROGs") and VOCs as both "emitted from the incomplete combustion of hydrocarbon or other carbon-based fuels," and describes other types of sources of VOCs, including industry, "petroleum fuels, solvents, dry cleaning solutions and paint;" it *nowhere* mentions that VOCs are emitted by the cannabis plants themselves. *See id*.

---

[5] National Ambient Air Quality Standards for Ozone, 80 Fed. Reg. 65292 (September 17, 2021) https://www.govinfo.gov/content/pkg/FR-2015-10-26/pdf/2015-26594.pdf.

[6] V. Samburova et al. Dominant Volatile Organic Compounds (Vocs) Measured at Four Cannabis Growing Facilities: Pilot Study Results. 69 (11) J. Air Waste Mgmt. Assoc. 1267 (Nov. 2019). https://pubmed.ncbi.nlm.nih.gov/31498732/.

[7] Denver Public Health & Environment. Cannabis Environmental Best Management Practices Guide 2 (October 2019). https://www.denvergov.org/content/dam/denvergov/Portals/771/documents/EQ/MJ%20Sustainability/6_Cannabis_BestPracticesManagementGuide_AirQuality.pdf#:~:text=Cannabis%20plants%20naturally%20emit%20terpenes%2C%20which%20are%20volatile,when%20ground-level%20ozone%20levels%20often%20exceed%20health%20standards.

Continuing, the PEIR only discusses how commercial cannabis cultivation might contribute to air pollution "through the use of heavy equipment, tilling operations, waste burning, operation of gasoline- or diesel-fuel equipment such as generators and well pumps, vehicle trips to and from a licensed cannabis site by employees and customers, and truck trips to and from a site by vendors and transporters." PEIR at 3.3-17. Elsewhere, the PEIR discusses how operations from cannabis activities could potentially violate an ambient air quality standard, contribute to an air quality violation or result in a cumulatively considerable net increase of a criteria pollutant for which the County is in nonattainment; but, again, it only discusses *combustion-related emissions* from mobile sources – cars and trucks transporting people and products to and from the sites. PEIR at 3.3-20. It says *nothing* about the potential contributions to air quality violations associated with biogenic VOCs from the cultivation of cannabis itself.

In short, the PEIR's assessment of the air quality impacts resulting from cannabis cultivation on violations of air quality standards focuses solely on emissions of pollutants associated with combustion of fuels in vehicles used to transport people and products from the site, or in equipment associated with cultivation activities, e.g., well pumps and tilling. Emissions of biogenic VOCs from cannabis cultivation and processing are only discussed as a potential source of odors. PEIR at 3.3-22-23. Nowhere does the PEIR attempt to quantify or assess how or whether biogenic VOCs from cannabis cultivation cause or contribute to nonattainment with ozone standards or result in exposure to hazardous air pollutants and toxic air contaminants.

Because the effects of such emissions were not examined in the PEIR, they should have been considered through completion of a new initial study and either an EIR or mitigated negative declaration in association with this specific Project. CEQA Guidelines § 15168(c)(1). The failure to do so prior to the County's approval of the Project amounts to a violation of CEQA.

3. The PEIR failed to consider significant impacts attributable to biogenic VOC emissions from cannabis cultivation

    a) The County failed to give any consideration to the impacts that emissions attributable to cannabis cultivation will have on nonattainment with the federal ozone standard in San Luis Obispo County

The PEIR reports that Santa Barbara County was designated as attainment for the 2008 federal ozone NAAQS and that CARB was recommending that the County be designated attainment for the more stringent 2015 federal ozone NAAQS as well. PEIR at 3.3-5. It therefore assesses impacts from commercial cannabis operations on attainment of federal air quality standards only within Santa Barbara County, which it reports is attaining the federal ozone NAAQS. But it fails to give *any* consideration to how emissions from cannabis cultivation might impact nonattainment with the ozone NAAQS outside of Santa Barbara County. This is of considerable concern in this case because the Project's property line constitutes the southern boundary of the

portion of San Luis Obispo County, which the EPA has since designated as nonattainment for the 2015 ozone NAAQS.[8]

Even had the PEIR endeavored to consider the impact that biogenic VOC emissions from cannabis cultivation might have on attainment of air quality standards outside of Santa Barbara County (which it did not), at the time of the PEIR's certification, EPA had not yet designated the Eastern part of San Luis Obispo County as nonattainment with the 2015 ozone NAAQS. That designation was not made until April 30, 2018, and published in the Federal Register until June 4, 2018.[9] Rather, at the time when the PEIR was certified, EPA had recently finalized a determination that the Eastern portion of San Luis Obispo County had *attained* the 2008 ozone NAAQS by the applicable attainment date based upon three-years of quality assured data showing compliance with the less stringent 2008 standard of 0.075 parts per million (ppm) NAAQS.[10]

Since certification of the PEIR, EPA has now designated the Eastern portion of San Luis Obispo County as nonattainment for the more stringent 2015 ozone NAAQS of 0.070 ppm. The underlying technical analysis was based both on recorded violations of the NAAQS occurring in San Luis Obispo County and also on EPA's consideration of the area's adjacency to Kern County,[11] which is part of the San Joaquin Valley extreme ozone nonattainment area and where some of the worst air quality in the United States is observed.

Notably, that technical analysis includes "back trajectories" illustrating the source of emissions impacting locations within the San Joaquin Valley that violate the federal ozone NAAQS. Those trajectories demonstrate that emissions occurring *in the immediate vicinity of the Project site* could, in fact, impact downwind locations as far away as the San Joaquin Valley.[12] They also illustrate a fact that should have been self-evident to the County prior to approval of the Project: Air pollution does not observe jurisdictional boundaries. Here, where the Project's property line is literally the boundary for the San Luis Obispo County federal ozone nonattainment area, any

---

[8] EPA Greenbook. California 8-hour Ozone Nonattainment Areas (2015 Standard) Area Map. https://www3.epa.gov/airquality/greenbook/ca8_2015.html (last accessed Sept. 17, 2021).

[9] 83 Fed. Reg. 25,776, 25,790 (Jun. 4, 2018) (amending 40 C.F.R. § 81.305 to designate the Eastern part of San Luis Obispo County, including the are immediately adjacent to the north of the Project site nonattainment with the 2015 ozone NAAQS).

[10] 81 Fed. Reg. 93,620 93,621 (Dec. 21, 2016) (adding 40 C.F.R. § 52.282(i) to the California State Implementation Plan, providing: "*Determination of attainment*. The EPA has determined that, as of January 20, 2017, the San Luis Obispo (Eastern San Luis Obispo) 2008 8-hour ozone nonattainment area in California has attained the 2008 ozone standard by the July 20, 2016 applicable attainment date, based upon complete, quality-assured and certified data for 2013-2015.").

[11] EPA, California Intended Area Designations for the 2015 Ozone National Ambient Air Quality Standards Technical Support Document. https://www.epa.gov/sites/default/files/2017-12/documents/ca_120d_tsd_combined_final.pdf (last accessed Sept. 18, 2021).

[12] *See id*. at Figures 16.6a, 16.6b, 16.6c, 16.6e and 16.6h (showing back trajectories for violating monitors in Clovis, Bakersfield, Corcoran, Merced and Sequoia with emissions originating from the immediate vicinity of the Project site in Santa Barbara County).

molecule of biogenic VOCs crossing the property line will cause or contribute to ozone pollution in an area that has been designated nonattainment with the federal ozone NAAQS.

Even where a source is not a "major stationary source," the federal Clean Air Act requires that every state plan for attainment of the NAAQS must include "legally enforceable procedures" for determining whether the construction of any new source "will result in … [i]nterference with attainment or maintenance of a national standard in the State in which the proposed source or modification is located *or in a neighboring State*." 40 C.F.R. § 51.160(a) (emphasis added). EPA's rules further require that "the State or local agency responsible for final decisionmaking on an application" for construction of any such "minor" source must prevent it from being constructed if "[i]t will interfere with the attainment or maintenance of a national standard. *Id*. at § 51.160(b). In sum, the Clean Air Act acknowledges that even "minor" sources can contribute to nonattainment in neighboring jurisdictions and requires permitting agencies to prevent such sources from being constructed if they would interfere with the attainment or maintenance of a NAAQS.

Yet in this case – where the County is approving commercial cultivation of sources of VOCs *literally over the fenceline* from a federal ozone nonattainment area – no consideration was given as to whether and how emissions of biogenic VOCs impact ozone pollution in that nonattainment area or will interfere with that area's attainment of the more stringent federal ozone standard.

Since the time when the County certified the PEIR, significant new information has come to light on the impacts of biogenic VOCs from commercial cannabis cultivation on ozone air pollution. One study originally published in November 2019 and available at the National Institute of Health's website concludes that "[h]igh concentrations of VOCs emitted from *Cannabis* grow facilities can lead to the formation of ozone, secondary VOCs (e.g., formaldehyde and acrolein), and particulate matter." [13] Observing that one adult cannabis plant "emits hundreds of micrograms of [biogenic] VOCs per day and thus can trigger formation of tropospheric ozone [ ] and other toxic air pollutants," the authors conclude that, "[o]ur results highlight that further assessment of VOC emissions from *Cannabis* facilities is needed, and this assessment is one of the key factors for developing policies for optimal air pollution control."[14]

This new scientific information on the impacts that VOC emissions from cannabis cultivation have on ozone pollution and the EPA's designation of the property immediately adjacent to the Project as a federal nonattainment area for the more stringent federal ozone NAAQS constitutes "[n]ew information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR was certified as complete;" and which demonstrates that the Project will have more significant effects than were examined by the PEIR; and that the significant effects examined by the PEIR will be substantially more severe than shown by the PEIR. Guidelines at § 15162(a)(3)(A)-(B). The failure of the County to consider such information and conduct an assessment of such effects constitutes a violation of CEQA and is unlawful.

---

[13] *See supra* at note 6. It bears mentioning that formaldehyde and acrolein are federal hazardous air pollutants and California toxic air contaminants.

[14] *Id*.

b) The County failed to give any consideration to how emissions of biogenic VOCs from the Project will contribute to violations of the state ozone standard within Santa Barbara County

Santa Barbara County is a nonattainment area for the California ozone standard and yet, as discussed above, the PEIR does not address the ways in which biogenic VOCs from commercial-scale cultivation or processing of cannabis may contribute to that nonattainment. As described above, the PEIR only considered *combustion*-related sources of VOCs from cannabis cultivation and failed to even mention that cannabis cultivation produces biogenic VOC emissions that could contribute to ozone formation or other forms of air pollution.

Additionally, air quality conditions within Santa Barbara County have significantly changed since the PEIR was published. CARB, at time of the PEIR's certification, had designated Santa Barbara County as "nonattainment/transitional" with regard to ozone.[15] This transitional designation meant that the county was coming into attainment and, consequently, would not need to regulate potential ozone sources as stringently as counties located in nonattainment areas. Following the PEIR's certification, CARB took action to confirm that the County had, in fact, attained the state ozone standard and redesignated Santa Barbara County as attainment for that standard.[16]

However, that attainment status was short lived and, since the PEIR was issued, CARB has redesignated the county as nonattainment for the state ozone standard.[17] CARB's public hearing to approve that redesignation occurred on February 25, 2021. This redesignation constitutes a substantial change in circumstances under CEQA, which, coupled with the new scientific information on the impacts that biogenic VOCs from cannabis cultivation have on ozone pollution, requires the County to take a closer look at how the Project will contribute to and exacerbate nonattainment with the state ozone standard within Santa Barbara County and whether additional mitigation is warranted to reduce those impacts. Guidelines § 15162.

Indeed, when the County's Air Pollution Control Officer submitted comments to CARB on its redesignation of the County to nonattainment, the County committed to work with CARB to attain and maintain state and federal ambient air quality standards and "to help the community better understand *emission sources* and air quality issues."[18] Yet, with the County Board of Supervisor's

---

[15] *See* Final Regulation Order (amending Cal. Code Reg. § 60201 to indicate Santa Barbara County as "Nonattainment-Transitional") submitted to the Office of Administrative Law February 27, 2017); https://ww3.arb.ca.gov/desig/changes/2016sec100.pdf (last accessed Sept. 18. 2021).

[16] *See* Final Regulation Order (amending Cal. Code Reg. § 60201 to indicate Santa Barbara County as "Attainment") submitted to the Office of Administrative Law March 23, 2020) https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2019/sad19/fro.pdf (last accessed Sept. 18. 2021).

[17] *See* Final Regulation Order (submitted to the Office of Administrative Law August 13, 2021) https://ww3.arb.ca.gov/board/15day/sad/fro.pdf (last accessed Sept. 16. 2021).

[18] Letter, from Aeron Arlin Genet, Air Pollution Control Officer, re: Proposed 2020 Amendments to Area Designations for State Ambient Air Quality Standards (Feb. 19, 2021) (emphasis added);

knowledge of the worsening ozone pollution in Santa Barbara County and after being provided with information concerning the impacts that biogenic VOCs from commercial cultivation have on ozone formation in this and other cannabis permit appeals, the County Planning Department has not performed, and the Planning Commission has not directed on appeal, *any* subsequent environmental assessment of whether and how such VOC emissions may impact nonattainment with the state ozone standard. Further, we understand that the County has not provided notice of the Project to the County's Air Pollution Control District, nor provided the District with the ability to review, comment on, or propose Project conditions. In so doing, the County has failed to satisfy the fundamental public informational requirements and purpose of CEQA and, accordingly, has acted unlawfully.

4. The County has failed to perform any subsequent environmental review that would meet the requirements of CEQA

Rather than conduct any additional analysis of the impact that biogenic VOC emissions would have on nonattainment with state or federal ozone standards in Santa Barbara or San Luis Obispo Counties, the County purported to address project-specific impacts through the completion of a checklist pursuant to Section 15168 of the Guidelines. However, that checklist did not mention VOCs or ozone at all, let alone discuss their impact on nonattainment.

When the issue of VOCs was raised in an appeal of the permitting of the Project at issue, the County Planning Commission's staff response mischaracterized both the science regarding biogenic VOCs and the PEIR's discussion of the issue. County staff's response to issue of VOCs reads, in its entirety:

> The Project was adequately evaluated under the PEIR and there is no new information of substantial importance showing that the Project will have substantially increased impacts to adjacent agriculture as a consequence of terpene contamination. There continues to be a lack of evidence that terpenes from cannabis cultivation result in impacts to the quality or marketability of surrounding agricultural crops. Terpenes are considered to be biogenic volatile organic compounds (VOCs). As explained by William Vizuete, professor of environmental sciences and engineering at the University of North Carolina during the Board of Supervisors hearing of August 20, 2019, and incorporated by reference, all living things emit biogenic VOCs. Therefore, biogenic VOCs are ubiquitous. Biogenic VOCs produced by plants are involved in plant growth development, reproduction, and defense. Cannabis plants primarily produce a kind of biogenic VOC called monoterpenes, which are aromatic oils that provide cannabis varieties with distinctive flavors like citrus, berry, mint, and pine. These are the same kind of terpenes that are found in other plants such as roses, orange trees, rosemary, and pine trees. Santa Barbara native oak and pine trees are also significant VOC emitters. VOCs and terpenes are discussed in the PEIR and were considered as part of the analysis of air

---

https://www.arb.ca.gov/lists/com-attach/2-areadesignations2020-VmRWYAQ3WTtWfVVn.pdf (last accessed Sept. 18, 2021).

> quality impacts. Their existence and alleged impacts are not new information. Moreover, to require subsequent CEQA review, the new information must show that the project would have one or more significant effects not discussed in the PEIR or that significant effects would be substantially more severe than shown in the PEIR. The Appellant has not produced substantial evidence supporting that other crops, including vineyards, absorb cannabis terpenes and, if so, the affect it has on their quality.[19]

The County's response confirms that biogenic VOCs resulting from cannabis cultivation were considered by the County only as a potential cause of terpene taint (the worry that terpenes from cannabis will impact the flavor of wine grapes). But the response mischaracterizes the PEIR's analysis and paints with too broad of a brush in arguing that "VOCs and terpenes are discussed in the PEIR and were considered as part of the analysis of air quality impacts." As described above, the PEIR only analyzed the ozone impacts associated with VOC emissions from combustion of fuels in mobile sources and agricultural equipment; it completely failed to even describe the biogenic VOCs emitted by cannabis plants or to consider how those emissions could contribute to nonattainment with state or federal ozone standards in Santa Barbara County, San Luis Obispo County, or elsewhere.

As also described above, since the time when the County certified the PEIR, significant new information has come to light on the impact that biogenic VOCs from commercial cannabis cultivation have on air pollution. This information indicates that VOCs from cannabis can contribute to ozone, particulate matter and toxic air pollutants, including formaldehyde and acrolein.[20] Formaldehyde and acrolein are carcinogens, and there is absolutely no discussion of these emissions within the PEIR or otherwise.

The County brushed aside any concerns regarding biogenic VOC emissions from the Project, noting the biogenic VOCs are ubiquitous and considering only their contribution to potential "terpene taint;" i.e., product quality issues for wine producers. In the PEIR, the County considered only the potential *odor* impacts that might result from these biogenic VOCs or terpenes and it considered only how the combustion-related VOC emissions – and not the biogenic VOCs – from cannabis cultivation might contribute to nonattainment with state and federal ozone standards.

Under CEQA, "[i]f a later activity would have effects that were not examined in the program EIR, a new initial study would need to be prepared leading to either an EIR or a negative declaration." Guidelines § 15168(c)(1). Further review is especially relevant here where new large-scale cultivation is set to occur in and adjacent to nonattainment areas. Given that Santa Barbara County was subsequently designated nonattainment for the state ozone standard and the area of San Luis Obispo County lying literally over the northern property line has been subsequently

---

[19] Santa Barbara County Planning Commission. Staff Report for the Appeal of the Canna Rios, LLC – Cannabis Cultivation Land Use Permit, §2.D. (April 27, 2021)

[20] *See supra* at note 6.

designated as nonattainment for the more stringent 2015 federal ozone standard, it is legally incorrect to conclude that "[t]he Project was adequately evaluated under the PEIR and there is no new information of substantial importance."[21]

B. The PEIR Fails to Adequately Address the Project's Potential Emission of Hydrofluorocarbons and Their Impact on Climate Change

The PEIR fails to adequately address the specific sources of hydrofluorocarbon ("HFC") emissions within the County's cannabis industry. The subsequent CEQA checklist also fails to address or even mention the Project's potential for HFC emissions. Additionally, as discussed below, since the PEIR was certified, scientists, regulators, and lawmakers have all called for an increased effort to curb HFC emissions, driven in part by the worsening impacts from climate change and the commercial availability of low global warming-potential substitutes for HFCs. This constitutes new information of substantial importance and substantially changed circumstances warranting further environmental review under CEQA.

As the PEIR summarizes, HFCs are a type of greenhouse gas ("GHG"), which "are typically used as refrigerants." PEIR at 3.3-9. Other than providing a definition for HFCs, however, the PEIR does little to analyze the environmental impact of HFCs, and specifically neglects to address foreseeable sources of HFCs in cannabis-related activities throughout the County. Instead, the PEIR provides the following brief discussion: "[HFCs] are typically used as refrigerants for both stationary refrigeration and mobile air conditioning. The use of HFCs for cooling and foam blowing is growing, as the continued phase out of chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs) gains momentum. The USEPA adopted Global Warming Potentials of HFCs range from 140 for HFC-152a to 11,700 for HFC-23." PEIR 3.3-9.

The Project will include on-site freezing of cannabis.[22] As the PEIR reports, HFC emissions are typically associated with refrigeration. Although specifics of the Project's freezing process are still scarce, enough is known to conclude that this aspect of the proposed operation is not adequately addressed by the PEIR or the Commission's subsequent CEQA §15168 checklist. Indeed, the PEIR does not analyze the HFC emissions associated with freezers and refrigerators at all. Instead, the only impacts attributable to refrigeration that the PEIR analyzes are *electricity demand* and *noise* concerns associated with "non-cultivating commercial cannabis operations." *See* PEIR at 3.13-24. Similarly, the checklist does not discuss HFC emissions at all, or any of the environmental impacts associated with the planned on-site freezing operations.

CEQA requires more analysis. Section 15168(c)(1) of the Guidelines provides: "[i]f a later activity would have effects that were not examined in the program EIR, a new initial study would need to be prepared leading to either an EIR or a negative declaration." Guidelines § 15168(c)(1). Because

---

[21] Santa Barbara County Planning Commission. Staff Report for the Appeal of the Canna Rios, LLC – Cannabis Cultivation Land Use Permit, §2.D. (April 27, 2021)

[22] *See* April 27, 2021 Staff Report, §5.2.

the PEIR included no consideration of potential HFC emissions from commercial cannabis cultivation, it should have been considered by the County prior to approval of the Project.

Additionally, since the certification of the PEIR, there is growing appreciation for the role HFC emissions play in climate change. The World Meteorological Organization's 2018 report devotes an entire chapter to HFC emissions, noting their increasing use and significance in global warming.[23] Relatedly, curtailing emissions of HFCs – which are the fastest growing source of GHGs globally[24] – has become an increasing area of focus in both federal and state efforts to address climate change, driven in part by the commercial availability of low global warming-potential substitutes for HFCs. The increasing focus on HFCs and availability of substitutes for their use in refrigeration warrant further environmental review of the impacts associated with the Project's on-site freezer. *See* Guidelines §§ 15162(a)(2)–(3).

1. California has increasingly focused on refrigerants as super-polluters

The PEIR refers generally to the county-wide cannabis program's consistency with GHG reductions prescribed in CARB's Scoping Plan. *See* PEIR at 3.3-16. But other than describing what HFCs are, it bears *no* acknowledgement that commercial cannabis cultivation might result in HFC emissions.

Since the PEIR's certification in February 2018, CARB has begun updating its Scoping Plan, and has made HFCs an area of specific focus. In 2018, the California Legislature passed and the Governor signed SB 1013, which imposes prohibitions on use of HFCs in many commercial and residential refrigeration applications, among other uses.[25] CARB also adopted corresponding regulations, establishing end-use dates for use of HFCs in various stationary refrigeration and foam end-uses.[26] These laws and regulations were passed with wide industry support due to the availability of commercial substitutes for HFCs that have a lower global-warming potential.

More recently, in August, CARB announced that it was working on a 2022 update to the Scoping Plan, and it has made clear that reducing HFC emissions and other short-lived climate pollutants

---

[23] World Meteorological Organization, Scientific Assessment of Ozone Depletion: 2018, World Meteorological Organization, Global Ozone Research and Monitoring Project—Report No. 58, 67 pp., Geneva, Switzerland, 2018. https://ozone.unep.org/sites/default/files/2019-05/SAP-2018-Assessment-report.pdf.

[24] Center for Climate and Energy Solutions, "Controlling Industrial Greenhouse Gas Emissions" (2021). https://www.c2es.org/content/regulating-industrial-sector-carbon-emissions/.

[25] Senate Bill 1013 (2018) (known as the California Cooling Act, filed with the Secretary of State on September 13, 2018) (enacting, *inter alia,* Cal. Health & Saf. Code § 39734).

[26] Cal. Code Reg. tit. 17 §§ 95371-95377 (submitted to the Office of Administrative Law on November 13, 2018 and filed with the Secretary of State on and with an effective date of December 27, 2018, pursuant to CARB's request for an early effective date). https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2018/casnap/reedcasnap.pdf?_ga=2.155921917.718169624.1632174496-994147807.1608159414.

("SLCP") will be a main focus going forward. On September 8, 2021, for example, CARB held a workshop to develop the scoping plan, and in the notice for the workshop, CARB explained that "[b]ecause SLCP impacts are especially strong over the short term, acting now to reduce their emissions can have an immediate beneficial impact on climate change and public health."

2. The United States is focusing on eliminating super-polluters associated with refrigeration

At the federal level, curtailing HFC emissions has been at the forefront of recent efforts to address global warming. For example, on January 27, 2021, President Biden signed the Executive Order on Tackling the Climate Crisis at Home and Abroad,[27] which, among other things, instructed the Secretary of State to "prepare, within 60 days of the date of this order, a transmittal package seeking the Senate's advice and consent to ratification of the Kigali Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, *regarding the phasedown of the production and consumption of hydrofluorocarbons*." *Id.* (emphasis added).

Additionally, in 2020, a bipartisan coalition of senators championed the American Innovation and Manufacturing ("AIM") Act of 2020. Briefly, the AIM Act of 2020 instructs the EPA Administrator to address HFCs in a number of ways, including by phasing down their production and consumption. Pursuant to that direction, the EPA Administrator today signed the agency's first rule to phase down the production and consumption of HFCs.[28] In that rule, the EPA notes that "HFCs are potent greenhouse gases (GHGs) with 100-year global warming potentials (GWPs) (a measure of the relative climatic impact of a GHG) that can be hundreds to thousands of times more potent than carbon dioxide (CO2)."[29] When it announced the proposed rule, the EPA explained that reducing "highly potent HFCs" is "an important step toward meeting [the United States' Paris Agreement pledge to reduce national greenhouse gas emissions by 50 to 52 percent below 2005 levels by 2030]."[30] Additionally, in the final rule signed today, the EPA noted that, in concert with other nations implementing the phasedown schedule required by the Kigali Amendment, the global phasedown "is expected to avoid up to 0.5 °C of warming by 2100."[31]

---

[27] Exec. Order No. 14,008, Fed. Reg. Vol. 86, No. 19 (January 27, 2021).

[28] U.S. EPA, Phasedown of Hydrofluorocarbons: Establishing the Allowance Allocation Under the American Innovation and Manufacturing Act, pre-publication rule (September 23, 2021). Pre-publication rule available at https://www.epa.gov/system/files/documents/2021-09/san-8458-preamble-092221-prepub-with-header.pdf.

[29] Pre-publication rule at 24.

[30] U.S. EPA, EPA Moves Forward with Phase Down of Climate-Damaging Hydrofluorocarbons (May 3, 2021). https://www.epa.gov/newsreleases/epa-moves-forward-phase-down-climate-damaging-hydrofluorocarbons.

[31] Pre-publication rule, at 26.

3. Further environmental review is necessary to consider the climate change impacts associated with cannabis freezing under CEQA

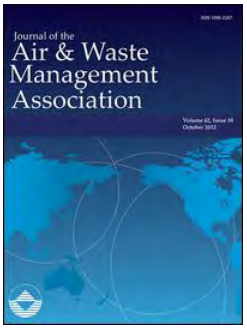
As described above, the PEIR failed to give any consideration to HFC emissions associated with commercial cannabis cultivation; the only environmental impacts considered in association with refrigeration were electricity demand and noise. And, despite the fact that the County's approval for the Project includes some type of unspecified flash freezing operation, the County made no effort to assess the potential impacts from that operation. The Project's potential impacts associated with emissions of HFCs warranted further environmental review. *See* Guidelines § 15168(c)(1). Additionally, the increasing focus on curtailing HFC emissions at the state and federal level, including requirements to use newly available lower global warming-potential substitutes for HFCs as refrigerants, constitutes changes "to the circumstances under which the project is undertaken," which similarly must be accounted for via supplementary environmental review. *See id.* § 15162(a)(2).

III. Conclusion

The County erred in relying upon the PEIR as the basis for the approval of the Project because the PEIR failed to include consideration of the impacts associated with biogenic VOC emissions or HFCs from the Project. Until these shortcomings are addressed, the environmental review of the Project is legally inadequate and violates CEQA.

As described above, the PEIR only considered the impact of combustion-related VOCs from mobile sources and agricultural equipment on nonattainment with state and federal ozone standards and only within Santa Barbara County; the only air quality impacts considered in relation to biogenic VOCs were odors and, during the subsequent appeal, "terpene taint." Yet since the time when the PEIR was certified, new scientific studies have been published indicating that biogenic VOC emissions from commercial cannabis cultivation contribute to ozone and other air pollution. Additionally, since the time when the PEIR was certified, the portion of San Luis Obispo County lying literally at the northern boundary of the Project site has been designated nonattainment for the more stringent 2015 ozone NAAQS, and Santa Barbara County has been redesignated as nonattainment for the state ozone standard. Technical analyses supporting EPA's ozone designations illustrate how emissions occurring within the vicinity of the Project site could have impacts on nonattainment as far downwind as Merced or Bakersfield, which are designated as extreme ozone nonattainment areas and experience some of the worst air pollution in the nation. This new information and the changes in ozone designations demand further environmental review to understand the role that biogenic VOCs from the Project will have on ozone pollution and on violations of state and federal ozone standards, both within Santa Barbara County and elsewhere. *See* Guidelines § 15162(a)(2)-(3).

Additionally, the PEIR and the CEQA checklist fail to address the Project's potential for HFC emissions and the associated impacts on global warming; this, despite the fact that the Project will feature some type of on-site freezer and HFCs used as refrigerants are the fastest growing global source of GHG emissions. The only consideration that the PEIR gave to the environmental impacts resulting from refrigeration used in association with commercial cannabis cultivation was with respect to noise and electricity consumption. Because the Project's potential HFC emissions and resulting impact on climate change were not considered, further environmental review is warranted at this time. *See id.* at §§ 15168(c)(1); 15162(a)(2)-(3).



Journal of the Air & Waste Management Association

ISSN: 1096-2247 (Print) 2162-2906 (Online) Journal homepage: https://www.tandfonline.com/loi/uawm20

Dominant volatile organic compounds (VOCs) measured at four *Cannabis* growing facilities: pilot study results

Vera Samburova, Mark McDaniel, Dave Campbell, Michael Wolf, William R. Stockwell & Andrey Khlystov

To cite this article: Vera Samburova, Mark McDaniel, Dave Campbell, Michael Wolf, William R. Stockwell & Andrey Khlystov (2019): Dominant volatile organic compounds (VOCs) measured at four *Cannabis* growing facilities: pilot study results, Journal of the Air & Waste Management Association, DOI: 10.1080/10962247.2019.1654038

To link to this article: https://doi.org/10.1080/10962247.2019.1654038

JOURNAL OF THE AIR & WASTE MANAGEMENT ASSOCIATION
https://doi.org/10.1080/10962247.2019.1654038

Taylor & Francis
Taylor & Francis Group

NOTEBOOK PAPER

Dominant volatile organic compounds (VOCs) measured at four *Cannabis* growing facilities: pilot study results

Vera Samburova[a], Mark McDaniel[a], Dave Campbell[a], Michael Wolf[b], William R. Stockwell[c], and Andrey Khlystov[a]

[a]Division of Atmospheric Sciences, Desert Research Institute, Reno, NV, USA; [b]Air Quality Management Division, Washoe County Health District, Reno, NV, USA; [c]Department of Physics, University of Texas at El Paso, El Paso, TX, USA

ABSTRACT

In recent years, sale of recreational marijuana products has been permitted in several states and countries resulting in rapid growth of the commercial cannabis cultivation and processing industry. As previous research has shown, biogenic volatile organic compounds (BVOCs) emitted from plants can react with other urban air constituents (e.g., NOx, HO radical) and thus negatively affect regional air quality. In this pilot study, BVOC emissions from *Cannabis* plants were analyzed at four grow facilities. The concentrations of measured BVOCs inside the facilities were between 110 and 5,500 μg m^{-3}. One adult *Cannabis* plant emits hundreds of micrograms of BVOCs per day and thus can trigger the formation of tropospheric ozone (approximately 2.6 g day^{-1} $plant^{-1}$) and other toxic air pollutants. In addition, high concentrations of butane (1,080– 43,000 μg m^{-3}), another reactive VOC, were observed at the facilities equipped with *Cannabis* oil extraction stations.

Implications: High concentrations of VOCs emitted from *Cannabis* grow facilities can lead to the formation of ozone, secondary VOCs (e.g., formaldehyde and acrolein), and particulate matter. Our results highlight that further assessment of VOC emissions from *Cannabis* facilities is needed, and this assessment is one of the key factors for developing policies for optimal air pollution control.

PAPER HISTORY
Received April 23, 2019
Revised July 21, 2019
Accepted August 01, 2019

Introduction

It is well-known that vegetation is the largest source of atmospheric biogenic volatile organic compounds (BVOCs) (Atkinson and Arey 2003), contributing a significant fraction (approximately 89%) of the total atmospheric VOCs (Goldstein and Galbally 2007). Trees and other types of vegetation emit BVOCs, such as isoprene, pinenes, and terpenoid compounds (Fuentes et al. 2000). Sindelarova et al. (2014) reported that the mean total global emission of BVOCs is 760 Tg (C) $year^{-1}$, with main constituents such as isoprene (70%), monoterpenes (11%), and sesquiterpenes (2.5%). The average global isoprene emission was found to be 594 Tg $year^{-1}$, while for North America, it was 34.5 Tg $year^{-1}$. The principle reactions of BVOCs are with the hydroxyl radical (HO), ozone (O_3) and the nitrate radical (NO_3) (Fuentes et al. 2000). Since the lifetimes of major BVOCs ranges from minutes to a few hours (Atkinson and Arey 2003), they play a major role in the chemistry of the lower troposphere. For example, the lifetime of the most abundant BVOC, isoprene, is 1.4 hours with respect to its reaction with HO radical (Atkinson and Arey 2003), assuming that HO radical concentration is 2×10^6 cm^{-3}. Emitted in the air BVOCs react with HO, NO_3 and O_3 to yield products that react with nitrogen oxides and form pollutants such as ozone, formaldehyde, acetaldehyde, and acrolein (Li et al. 2016; Papiez et al. 2009; Seinfeld and Pandis 2016). Some of these pollutants are potentially hazardous compounds. Tropospheric ozone, for example, is one of the criteria air pollutants (Atkinson 2000; Logan 1985), which, in high concentrations, has harmful effects on human health (Brunekreef and Holgate 2002; Gryparis et al. 2004; Yang et al. 2003) and the environment (Chuwah et al. 2015; Dickson et al. 2001; Mills et al. 2011). Papiez et al. (2009) found that BVOCs emitted by landscaped vegetation contribute significantly to ozone growth rates in the Las Vegas region and should be considered as one of the sources of ozone air pollution. The oxidation of higher molecular weight VOCs and BVOCs produces secondary organic aerosol particles (SOA) that may be even more harmful than ozone (Claeys et al. 2004; Hoffmann et al. 1997; Katsouyanni et al. 2001).

CONTACT Vera Samburova vera.samburova@dri.edu Division of Atmospheric Sciences, Desert Research Institute, Reno, NV, USA.
Color versions of one or more of the figures in the paper can be found online at www.tandfonline.com/uawm.
Supplemental data for this paper can be accessed here.

Because of the importance of atmospheric photochemical reactions, the estimation of atmospheric VOC emissions, including BVOCs, is needed where NOx emissions are high. *Cannabis* facilities are typically built in urbanized areas near automobile roads, which are known areas of high NOx concentration. These facilities can be a source of large amounts of BVOC and VOC generated during the production of *Cannabis* products. The oxidation of highly reactive BVOCs from *Cannabis* plants can lead to the formation of ozone and secondary VOCs (e.g., formaldehyde and acrolein). In recent years, the *Cannabis* market has increased drastically since the sale of recreational marijuana has been permitted in several states. At the same time, not much information on BVOC emissions from *Cannabis* is currently available. Therefore, identification of the speciated VOCs at commercial *Cannabis* facilities is needed. The goal of this pilot study is to characterize and quantitatively analyze VOC emissions at commercial *Cannabis* grow facilities and identify what future steps should be taken to evaluate their contribution to photochemical processes and production of potentially harmful compounds. In this project, 80 individual VOCs, both biogenic and anthropogenic, were measured at four different *Cannabis* producers located in California and Nevada. To our knowledge, this study is the first attempt to obtain a detailed profile and concentrations of VOCs at commercial *Cannabis* grow facilities.

Experimental

Materials and methods

To accurately identify and quantify BVOCs, a standard mixture of VOCs (Table S1) was purchased from Apel-Reimer Environmental Inc. (Broomfield, CO, USA) and a standard mixture of *Cannabis* VOCs (Table S2) was obtained from Restek (Restek Corporation, Bellefonte, PA, USA).

VOC sampling and analysis

VOC sampling canisters were cleaned prior to sampling by repeated evacuation and pressurization with humidified zero air (Airgas, Inc., Radnor, PA, USA), as described in the EPA document "Technical Assistance Document for Sampling and Analysis of Ozone Precursors" (U.S.EPA 1998, 2009) (Supplementary Material).

Canister samples were analyzed for BVOC and non-BVOC species using gas chromatography instrument coupled with mass spectrometry and flame ionization detectors (GC-MS/FID) according to EPA Method TO-15 (U.S.EPA 1999). The GC-MS/FID system includes a Lotus Consulting Ultra-Trace Toxics sample preconcentration system built into a Varian 3800 GC with FID coupled to a Varian Saturn 2000 ion trap MS. The detailed description is presented in the Supplementary Material.

Calibration of the GC-MS/FID system was conducted with a mixture that contained hydrocarbons commonly found in the air (Table S1) in the range of 0.2 to 10 ppbv. Calibration of *Cannabis* VOCs was performed using a standard mixture of terpenes (Table S2). Five point external calibrations were run prior to analysis, and one calibration check was run every 24 hours. If the response of an individual compound was more than 10% off, the system was recalibrated. Replicate analysis was conducted at least 24 hours after the initial analysis to allow re-equilibration of the compounds within the canister.

Sampling and calculation of emission rates

All the facilities where the VOC samples were collected are commercial indoor-growing *Cannabis* facilities. One facility was located in California, and another three were in the state of Nevada. Measurements in Nevada were conducted at three locations within an urban area of Reno and Sparks, while the area around the facility in California can be characterized as sub-urban/rural. At all facilities, the rooms had no access to natural light, and they were equipped with high-pressure sodium (HPS) lamps. The relative humidity inside the grow rooms was 50%–60%, and the temperature was 24–28°C. The air in the grow rooms was well mixed with fans during the sampling (Figure S1, Supplementary Material). At all tested facilities, the sampling was conducted when the plants were at their flowering grow stage and their buds had reached full maturation. The plants cultivated were a mixture of *Cannabis Sativa, Cannabis Indica*, and hybrid strains. To sample the VOCs, a Teflon sampling tube was positioned 30 cm above the *Cannabis* canopy and the other end attached to the canister medium-volume sampler. The samples were collected in different rooms: the grow room, where plants are grown under controlled conditions; the curing room, where drying and aging of the harvested buds is performed; and the purging room, where removal of any residual solvents (e.g., liquid butane) is performed from the *Cannabis* concentrate using a vacuum oven or hot water bath. The data on plant strains and other growing conditions (fertilization, soil type, etc.) were not released to us.

Table 1. Concentrations of BVOCs and non-BVOCs at four different *Cannabis* grow facilities; *facilities with extraction stations; the standard deviations were calculated based three (in some cases two) replicate canister samples collected simultaneously; grow room is a room where plants are grown under controlled conditions; curing room: where drying and aging of the harvested buds is performed in a controlled environment; purging room: where removal of any residual solvents (e.g., liquid butane) is performed from the *Cannabis* concentrate using a vacuum oven or hot water bath.

Facility name	*Total BVOCs, μg m^{-3}*	*% of the total VOCs*	*Total non-BVOCs, μg m^{-3}*	*% of the total VOCs*	*Ratio: non-BVOCs/ BVOCs*
**Facility 1.*					
Outside	0.12 ± 0.01	**1**	15 ± 1	**99**	125
Curing room	863 ± 95	**19**	3764 ± 226	**81**	4.4
Grow room	1563 ± 172	**53**	1374 ± 82	**47**	0.9
Facility 2.					
After C-scrubber	25 ± 1	**30**	59 ± 7	**70**	2.4
Grow room (light/fan: off)	5502 ± 55	**99**	51 ± 6	**1**	0.01
Grow room (light/fan: on)	634 ± 4	**90**	71 ± 9	**10**	0.11
**Facility 3.*					
Outside	N/A	-	N/A	-	-
Grow room	196 ± 4	**3**	6686 ± 152	**97**	34
Purge room	1005 ± 90	**2**	49431 ± 2482	**98**	49
Facility 4.					
Outside	N/A	-	N/A	-	-
Grow room	112 ± 55	**72**	44 ± 3	**28**	0.4
Cure room	1055 ± 517	**96**	42 ± 3	**4**	0.04

The emission rates (ERs) of target compounds produced by *Cannabis* plants were measured only at Facility 2 that had one grow room (Table 1). The ERs derived assuming the growing room has well mixed air and losses of compounds due to depositions on walls and other surfaces were not considered. In order to obtain the ERs, BVOC concentrations were measured during steady state, when exhaust fan was on, and 10 min after the exhaust fan was turned off. The increase in concentrations was used to calculate the ERs (in mg min^{-1} plant^{-1}) of each individual VOC per time unit per plant:

$$ER_i = \frac{(C_{fan\ off} - C_{fan\ on}) \times V_{room}}{t \times N_{plants}} \quad (1)$$

where: $C_{fan\ off}$ – concentration of individual BVOC (mg m^{-3}) after the exhaust fan was turned off, $C_{fan\ on}$ – concentration of individual BVOC (mg m^{-3}) before the exhaust fan was turned off, t – time while the fan was off (10 min); V_{room} – volume of the room (m^3); N_{plants} – number of plants in the room.

Calculation of relative ozone formation potential of emitted BVOCs

Ozone formation potentials (OFP) are widely used to estimate the potential of individual VOC to form ozone in the air. While there are differenent possible methods of estimating OFP, here we use the concept of maximum incremental reactivity (MIR) that is based on incremental reactivity (Carter 1994). Carter defines incremental reactivity (IR) as the change in the O_3 mass concentration ($\Delta[O_3]$) due to an incremental change in the mass concentration of a VOC (Δ[VOC]) for standard conditions, Equation (2).

$$IR = \frac{\Delta[O_3]}{\Delta[VOC]} \quad (2)$$

To estimate maximum incremental reactivity, a standard VOC mixture is chosen and a series of simulations are made for varying concentrations of NO_x. There will be a NO_x level where the IR values reach a maximum, the MIR point (Carter 1994; Stockwell, Geiger, and Becker 2001). At the MIR point more simulations are made with incremental variations of individual VOCs to calculate MIR values from Equation (2). Note that the MIR point is at a NO_x level where O_3 production is very limited by the available VOC. Carter with the Calibornia Air Resources board performed these calculations (Carter 1994, 2009) and they provide tables of standard MIR values for individual VOC on the California Air Resources Board website (ARB 2012).

Here, the OFP of each measured emitted BVOC was estimated by multiplying its mass emission rate by its MIR value using the following equation:

$$OFP_i = ER_i \times MIR_i \quad (3)$$

where: ER_i – mass emission rate for individual VOC (mg plant^{-1} day^{-1});

MIR – maximum incremental reactivity in mg-O_3 mg-VOC^{-1}.

The relative OFP of the measured BVOC mixture was calculated by summing the OFPs for the mixture and dividing each OFP_i to determine the percent relative OFP (%OFP).

$$\%OFP = \frac{OFP_i \times 100\%}{\sum OFP_i} \quad (4)$$

Results and discussion

Concentrations of BVOCs and nonbiogenic VOCs measured at four *Cannabis* facilities are presented in Table 1. The variation of VOC levels between facilities and rooms depends on several factors, such as the number of plants and their growing stage, the performance of ventilation systems, the size of facility rooms, and the presence of other VOC sources. Overall, VOC levels are specific for each individual facility. The highest concentration of the total BVOCs was observed at Facility 2 (5502 ± 55 μg m^{-3}), when the fan was off and BVOCs accumulation was the largest. The lowest BVOC concentration was in the grow room of Facility 4 (112 ± 55 μg m^{-3}), even though in this room the number of plants per volume of the room was the highest among grow rooms at other facilities (Table S3). The total BVOCs were also measured outside the facilities (Facilities 1 and 2). In the case of Facility 1, the concentration of the total analyzed BVOCs was thousands of times lower outside than inside (Figure 1a). Facility 2 was equipped with C-scrubbers, and the samples were collected outside of the grow room as the area was not climate controlled. Even though Facility 2 was located in a forest area, the total concentration of BVOCs was significantly higher inside the facility than outside, being 220 times higher in the grow room with fan off and 25 times higher in the same room (with fan on) than outside (Figure 1b). Analysis of individual BVOCs showed that the most abundant compounds at all four facilities are β-myrcene, D-limonene, terpinolene, α-pinene, and β-pinene. For example, in the curing room at Facility 1 (Figure 1a), the top analyzed BVOCs were β-myrcene (54% of the BVOCs, 840 ± 96 μg m^{-3}), terpinolene (20%, 312 ± 23 μg m^{-3}), and

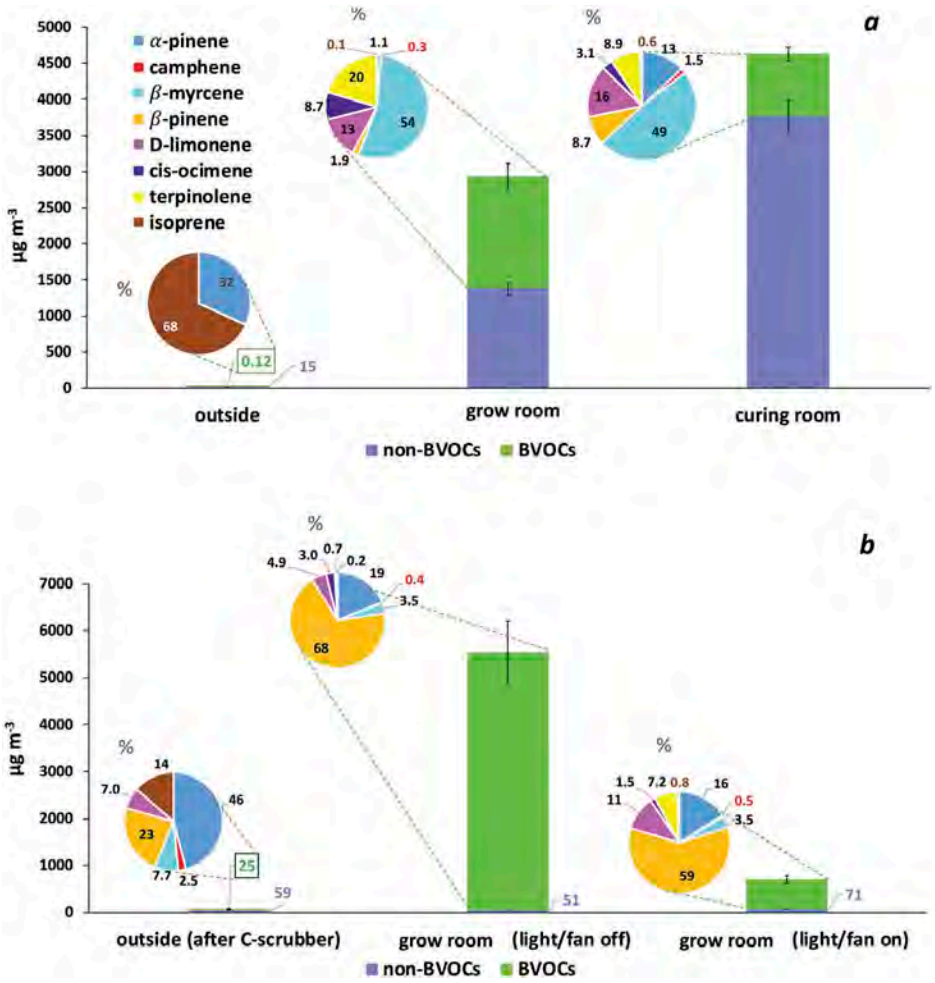


Figure 1. Biogenic (in μg m^{-3}) and non biogenic (in %) VOCs at four *Cannabis* facilities: (a) Facility 1, (b) Facility 2, (c) Facility 3, and (d) Facility 4. The standard deviations were calculated based on three (in some cases two) replicate canister samples collected simultaneously.

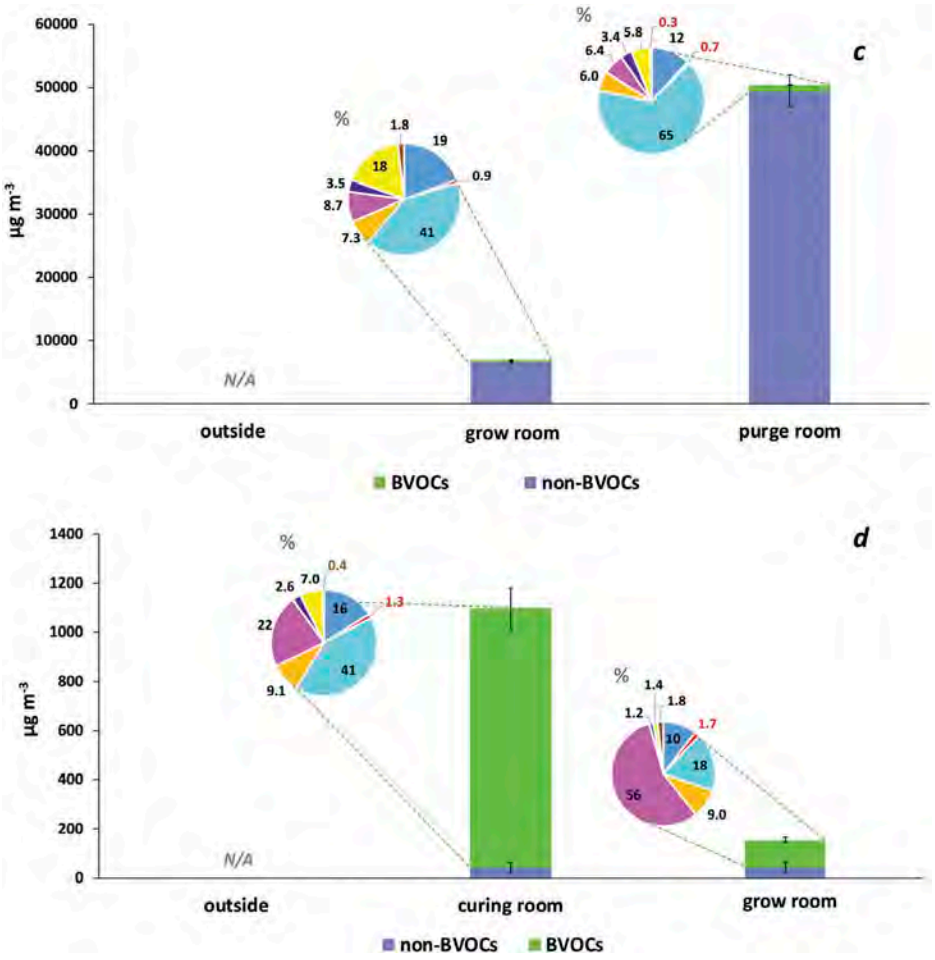


Figure 1. (Continued).

D-limonene (13%, 202 ± 12 µg m^{-3}). At the same time, the most abundant BVOCs outside of Facility 1 were isoprene (0.084 ± 0.009 µg m^{-3}) and α-pinene (0.039 ± 0.004 µg m^{-3}), being 68% and 32% of the total analyzed outside BVOCs, respectively. In comparison, the most abundant BVOCs at Facility 2 were β-pinene and α-pinene. When the fan and lights were off, the β-pinene and α-pinene concentrations were 3766 ± 452 µg m^{-3} and 1036 ± 124 µg m^{-3}, which are 68% and 19% of the total BVOCs, respectively (Figure 1b). Predictably, the BVOC levels were lower when the fan and lights were on, and the concentrations of β-pinene and α-pinene, the most abundant at Facility 2, were 377 ± 45 µg m^{-3} (59% of the total BVOCs) and 102 ± 12 µg m^{-3} (16% of the total BVOCs), respectively. For Facility 3 (Figure 1c), the most abundant BVOCs were β-myrcene (78–650 µg m^{-3}) and α-pinene (35–140 µg m^{-3}), while at Facility 4, the highest levels were observed for D-limonene (44–232 µg m^{-3}) and β-myrcene (10–432 µg m^{-3}). Isoprene is the major biogenic compound, being two-thirds of the total global BVOCs (Guenther et al. 1995; Sindelarova et al. 2014), and it is widely used as a tracer compound of biogenic emissions (Carlton, Wiedinmyer, and Kroll 2009; Kleindienst et al. 2007; Wang et al. 2013), while for *Cannabis* emissions, it is not in the top five of the analyzed BVOCs (Figure 1). Similar to our results, Wang et al. (2019) found that β-myrcene is one of the most abundant BVOCs emitted from four strains of *Cannabis* plants. However, in contrast to Wang's study, in our results, eucalyptol was not a dominating terpene at any of the tested commercial facilities.

The total concentrations of the non-BVOCs (Table 1) widely varied between the facilities with and without additional plant-processing stations. Facilities 1 and 3 were equipped with extraction stations, where low molecular weight alkanes, such as liquid butane, are used as an extraction solvent of the oil from the *Cannabis* plants. At these facilities, the total concentration of non-BVOCs in different rooms ranged from 1,290 to 52,000 µg m^{-3}. These levels of non-BVOCs were 0.9–49 times higher than BVOCs concentrations for the same rooms (Table 1). At Facilities 2 and 4, the non-BVOC concentrations ranged from 30 to 80 µg m^{-3} . BVOCs were 2.5–107 times higher than the non-BVOCs inside these facilities. Therefore, to control VOC emissions from *Cannabis* facilities, non-BVOCs must also be monitored, especially at the

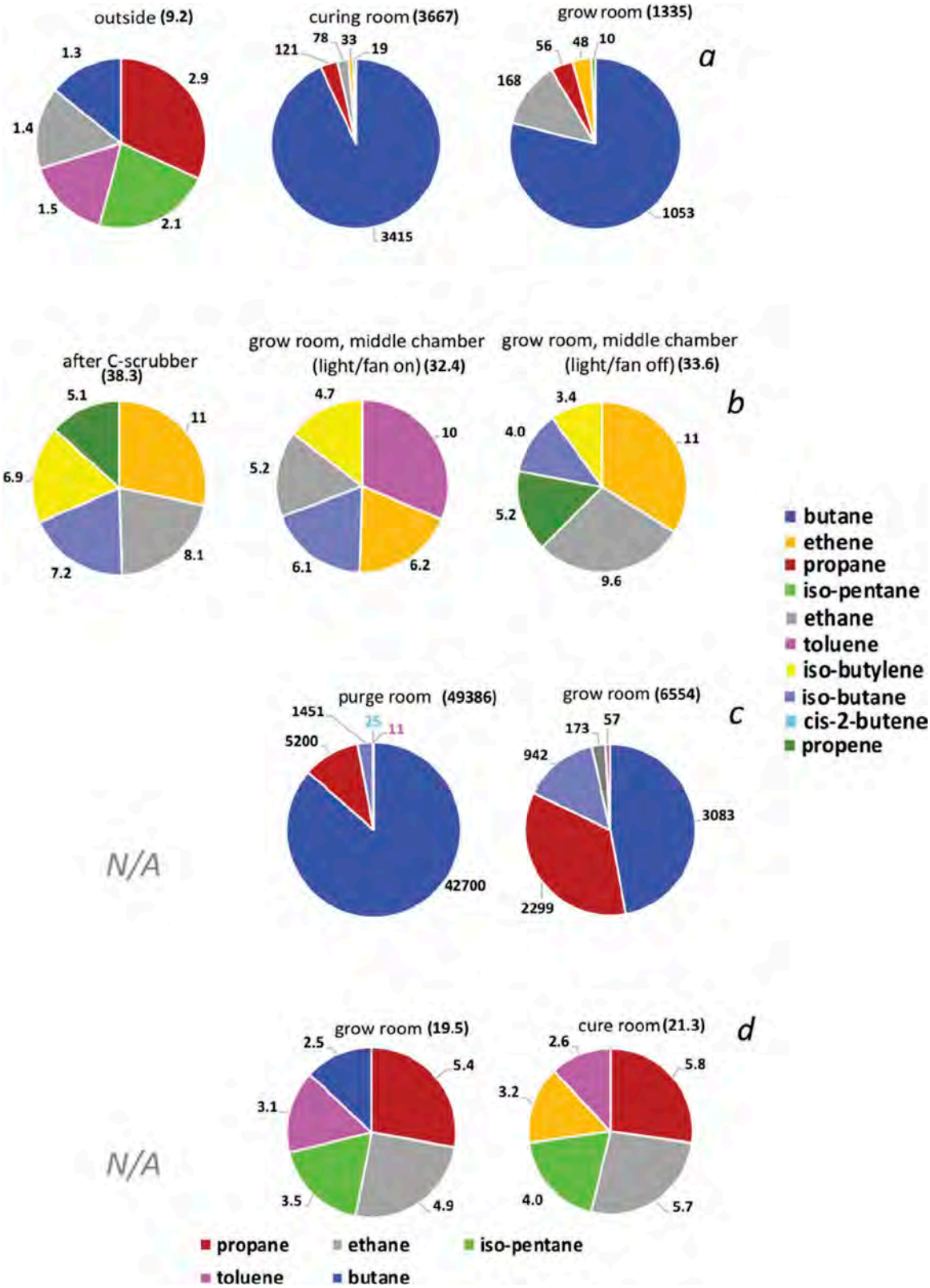


Figure 2. Top five non-BVOCs at four commercial *Cannabis* facilities: (a) Facility 1, (b) Facility 2, (c) Facility 3, (d) Facility 4; (in μg m^{-3}); total of the top five non-BVOCs are presented in brackets in bold font (units: μg m^{-3}).

facilities with additional processing of the *Cannabis* product.

Figure 2 presents the top five individual non-BVOCs that were detected at facilities with (Facility 1 and 3) and without (Facility 2 and 4) extraction stations. As was expected, butane was the dominant non-BVOC at the facilities where butane extraction was performed. For Facility 1, butane concentrations inside the curing and

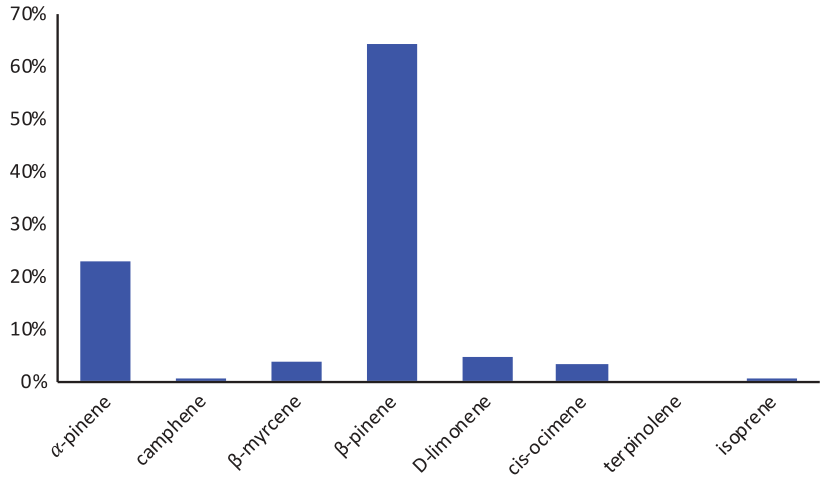


Figure 3. Relative contribution to ozone forming potential of the most abundant BVOCs at Facility 2.

grow rooms were 3,415 ± 205 (90.7% of total non-BVOCs) and 1,083 ± 43 μg m^{-3} (75.8% of total non-BVOCs), respectively, which are approximately 2,600 and 800 times more than the butane level measured outside of this facility (1.3 ± 0.4 μg m^{-3}). In the case of Facility 3, which was also equipped with an extraction station, the butane levels in its grow (3,083 ± 302 μg m^{-3}) and purge (42,723 ± 4,300 μg m^{-3}) rooms were 1.7–36 times higher than in the rooms of Facility 1, and butane was responsible for 46% and 86% of the total non-BVOCs, respectively (Figure 2). In Facilities 2 and 4, butane concentrations were low (2.5–4.3 μg m^{-3}) compared with Facilities 1 and 3, since there were no butane extraction stations there. Butane is one of the most reactive VOCs with a lifetime of 2.5 days under typical HO level atmospheric conditions (2×10^6 of HO radicals per m^{-3}) (Finlayson-Pitts and Pitts 2000). It is well-known that ozone is produced via photochemical reactions of n-butane with oxidants in the atmosphere (Andersson-Sköld, Grennfelt, and Pleijel 1992; Bowman, Pilinis, and Seinfeld 1995; Finlayson-Pitts and Pitts 1997). High concentrations of n-butane in the air can lead to high levels of harmful tropospheric ozone (Bell, Peng, and Dominici 2006; Fann et al. 2012; Kampa and Castanas 2008). Therefore, n-butane emissions from the facilities with butane extraction stations should not be ignored.

Emission rates and ozone-forming potential

To predict the potential of analyzed BVOCs for ozone formation, the ERs of target BVOCs were measured. We were able to obtain the ERs only for the BVOCs at Facility 2, and they are summarized in Table S4 (Supplementary Material). The highest ERs were observed for β-pinene (518 mg day^{-1} $plant^{-1}$), α-pinene (143 mg day^{-1} $plant^{-1}$), and D-limonene (31 mg day^{-1} $plant^{-1}$), which are 70%, 19%, and 4% of the total measured BVOCs (744 mg day^{-1} $plant^{-1}$), respectively.

Figure 3 shows the relative OFP contributions of the most abundant BVOCs collected at Facility 2. It is clear that α- and β-pinenes contributed the most to the OFP, being 87% of the total OFP for all analyzed *Cannabis* BVOCs. The OFP can significantly vary (more than two orders of magnitude) for the species with the same ER (Benjamin and Winer 1998). For example, MIR for isoprene (10.61, Supplementary Material) is three times higher than for β-pinene (3.52), but because ER for isoprene is more than 400 times lower than for β-pinene, β-pinene's contribution to ozone formation is significantly higher (146 times) than for isoprene's. However, as our results showed, BVOCs can vary among the facilities; therefore, different terpenes can be responsible for the formation of harmful compounds. Assuming that terpenes are released from Facility 2 into typical ambient conditions, α- and β-pinenes will be responsible for the formation of a maximum of approximately 2.6 g day^{-1} $plant^{-1}$ of ozone (Table S3), and plants that produce 1–10 g day^{-1} $plant^{-1}$ of ozone are considered as "medium" OFP species (Benjamin and Winer 1998).

Conclusion

The analysis of volatile terpenes at four commercial *Cannabis* facilities showed that the most abundant BVOCs at all facilities are β-myrcene, D-limonene, terpinolene, α-pinene, and β-pinene. The calculated terpenes' OFP at one of the facilities where ERs were measured demonstrated a significant contribution of α- and β-pinenes to the total OFP. These

results suggest that isoprene, which is a widely used tracer for studying chemistry and modeling of biogenic emissions, is not suitable for estimating BVOC emissions from *Cannabis* facilities and for understanding the chemical processes of *Cannabis* BVOCs in the lower troposphere. We also found that butane concentration at the facilities with cannabis oil extraction stations can be very high; thus, butane emissions from these facilities may significantly contribute to the chemistry of emitted-in-the-air VOCs, and it may lead to the formation of harmful compounds.

Since this research is a pilot study, there are several questions that need to be addressed in the future. Measuring at what rate BVOCs and other VOCs are emitted outside by *Cannabis* facilities and estimating the effect of these emissions on air quality will be important. The ERs should be measured for more than one *Cannabis* facility, and significantly more data points should be collected during these experiments. In this study, we have focused on volatile BVOCs collected with canisters, but our preliminary research showed that semivolatile biogenic organic compounds (e.g., linalool, β-caryophylene, and α-bisabolol) that can be sampled with Tenax sorbent tubes are also emitted by *Cannabis* plants in high quantities. The effects of these species on the formation of ozone, formaldehyde, and other harmful compounds have to be evaluated. Moreover, different types of plants (mainly *Cannabis sativa* and *Cannabis indica*) at different growing stages and conditions (soil type, light, fertilization, watering, ventilation, size of pots, concentration of CO_2 in grow rooms, relative humidity, temperature, etc.) may release BVOCs in various ratios (Niinemets, Loreto, and Reichstein 2004; Riedlmeier et al. 2017; Wiß et al. 2017). Knowing the ERs of BVOCs per plant, the non-BVOC concentrations in the facilities, the release of these emissions into the air, and the concentrations of NOx around the facilities can help estimate the impact of *Cannabis* grow facilities on air quality and develop optimal air pollution control strategies in the future.

Funding

This work was supported by the Desert Research Institute; Washoe County, NV.

About the authors

Vera Samburova, Ph.D., is an Associate Research Professor at Desert Research Institute, Reno, NV, USA.

Mark McDaniel, Ph.D., is a Research Scientist at Desert Research Institute, Reno, NV, USA.

Dave Campbell, MSc, is a Research Scientist at Desert Research Institute, Reno, NV, USA.

Michael Wolf, MSc, is a Permitting and Enforcement Branch Chief at Washoe County Health District, Reno, NV, USA.

William R. Stockwell, Ph.D., is an Affiliate Research Professor at Desert Research Institute, Reno, NV, USA.

Andrey Khlystov, Ph.D., is a full Professor at Desert Research Institute, Reno, NV, USA.

References

Andersson-Sköld, Y., P. Grennfelt, and K. Pleijel. 1992. Photochemical ozone creation potentials: a study of different concepts. *J. Air Waste Manage. Assoc.* 42 (9):1152–58. doi:10.1080/10473289.1992.10467060.

ARB. 2012. *California Air Resources Board (ARB), tables of Maximum Incremental Reactivity (MIR) values*. Sacramento, CA: California Air Resource Board.

Atkinson, R. 2000. Atmospheric chemistry of VOCs and NOx. *Atmos. Environ.* 34 (12–14):2063–101. doi:10.1016/S1352-2310(99)00460-4.

Atkinson, R., and J. Arey. 2003. Gas-phase tropospheric chemistry of biogenic volatile organic compounds: a review. *Atmos. Environ.* 37:S197–S219. doi:10.1016/S1352-2310(03)00391-1.

Bell, M. L., R. D. Peng, and F. Dominici. 2006. The exposure–response curve for ozone and risk of mortality and the adequacy of current ozone regulations. *Environ. Health Perspect.* 114 (4):532. doi:10.1289/ehp.8816.

Benjamin, M. T., and A. M. Winer. 1998. Estimating the ozone-forming potential of urban trees and shrubs. *Atmos. Environ.* 32 (1):53–68. doi:10.1016/S1352-2310(97)00176-3.

Bowman, F. M., C. Pilinis, and J. H. Seinfeld. 1995. Ozone and aerosol productivity of reactive organics. *Atmos. Environ.* 29 (5):579–89. doi:10.1016/1352-2310(94)00283-Q.

Brunekreef, B., and S. T. Holgate. 2002. Air pollution and health. *Lancet* 360 (9341):1233–42. doi:10.1016/S0140-6736(02)11274-8.

Carlton, A., C. Wiedinmyer, and J. Kroll. 2009. A review of Secondary Organic Aerosol (SOA) formation from isoprene. *Atmos. Chem. Phys.* 9 (14):4987–5005. doi:10.5194/acp-9-4987-2009.

Carter, W. P. 1994. Development of ozone reactivity scales for volatile organic compounds. *Air Waste* 44 (7):881–99. doi:10.1080/1073161X.1994.10467290.

Carter, W. P. 2009. *Updated maximum incremental reactivity scale and hydrocarbon bin reactivities for regulatory applications*. Riverside, CA: University of California, College of Engineering Center for Environmental Research and Technology.

Chuwah, C., T. van Noije, D. P. van Vuuren, E. Stehfest, and W. Hazeleger. 2015. Global impacts of surface ozone changes on crop yields and land use. *Atmos. Environ.* 106:11–23. doi:10.1016/j.atmosenv.2015.01.062.

Claeys, M., B. Graham, G. Vas, W. Wang, R. Vermeylen, V. Pashynska, J. Cafmeyer, P. Guyon, M. O. Andreae, and P. Artaxo. 2004. Formation of secondary organic aerosols through photooxidation of isoprene. *Science* 303 (5661):1173–76. doi:10.1126/science.1092805.

Dickson, R. E., M. Coleman, P. Pechter, and D. Karnosky. 2001. Growth and crown architecture of two aspen genotypes exposed to interacting ozone and carbon dioxide. *Environ. Pollut.* 115 (3):319–34.

Fann, N., A. D. Lamson, S. C. Anenberg, K. Wesson, D. Risley, and B. J. Hubbell. 2012. Estimating the national public health burden associated with exposure to ambient PM2.5 and ozone. *Risk Anal.* 32 (1):81–95. doi:10.1111/j.1539-6924.2011.01630.x.

Finlayson-Pitts, B. J., and J. N. Pitts. 1997. Tropospheric air pollution: ozone, airborne toxics, polycyclic aromatic hydrocarbons, and particles. *Science* 276 (5315):1045–51. doi:10.1126/science.276.5315.1045.

Finlayson-Pitts, B. J., and J. N. J. Pitts. 2000. *Chemistry of the upper and lower atmosphere*. San Diego, CA: Elsevier Science Publishing Co, Inc.

Fuentes, J. D., M. Lerdau, R. Atkinson, D. Baldocchi, J. Bottenheim, P. Ciccioli, B. Lamb, C. Geron, L. Gu, and A. Guenther. 2000. Biogenic hydrocarbons in the atmospheric boundary layer: a review. *Bull. Amer. Meteor. Soc.* 81 (7):1537–76. doi:10.1175/1520-0477(2000)081<1537:BHITAB>2.3.CO;2.

Goldstein, A. H., and I. E. Galbally. 2007. *Known and unexplored organic constituents in the earth's atmosphere. Environ. Sci. Technol.* 41 (5):1514-1521.

Gryparis, A., B. Forsberg, K. Katsouyanni, A. Analitis, G. Touloumi, J. Schwartz, E. Samoli, S. Medina, H. R. Anderson, and E. M. Niciu. 2004. Acute effects of ozone on mortality from the "air pollution and health: a European approach" project. *Am. J. Respir. Crit. Care Med.* 170 (10):1080–87. doi:10.1164/rccm.200403-333OC.

Guenther, A., C. N. Hewitt, D. Erickson, R. Fall, C. Geron, T. Graedel, P. Harley, L. Klinger, M. Lerdau, W. A. McKay, et al. 1995. A global-model of natural volatile organic-compound emissions. *J. Geophys. Res. Atmos.* 100 (D5):8873–92. doi:10.1029/94JD02950.

Hoffmann, T., J. R. Odum, F. Bowman, D. Collins, D. Klockow, R. C. Flagan, and J. H. Seinfeld. 1997. Formation of organic aerosols from the oxidation of biogenic hydrocarbons. *J. Atmos. Chem.* 26 (2):189–222. doi:10.1023/A:1005734301837.

Kampa, M., and E. Castanas. 2008. Human health effects of air pollution. *Environ. Pollut.* 151 (2):362–67. doi:10.1016/j.envpol.2007.06.012.

Katsouyanni, K., G. Touloumi, E. Samoli, A. Gryparis, A. Le Tertre, Y. Monopolis, G. Rossi, D. Zmirou, F. Ballester, and A. Boumghar. 2001. Confounding and effect modification in the short-term effects of ambient particles on total mortality: results from 29 European cities within the APHEA2 project. *Epidemiology* 12:521–31. doi:10.1097/00001648-200109000-00011.

Kleindienst, T. E., M. Jaoui, M. Lewandowski, J. H. Offenberg, C. W. Lewis, P. V. Bhave, and E. O. Edney. 2007. Estimates of the contributions of biogenic and anthropogenic hydrocarbons to secondary organic aerosol at a southeastern US location. *Atmos. Environ.* 41 (37):8288–300. doi:10.1016/j.atmosenv.2007.06.045.

Li, Y., M. C. Barth, G. Chen, E. G. Patton, S. W. Kim, A. Wisthaler, T. Mikoviny, A. Fried, R. Clark, and A. L. Steiner. 2016. Large-eddy simulation of biogenic VOC chemistry during the DISCOVER-AQ 2011 campaign. *J. Geophys. Res. Atmos.* 121 (13):8083–105. doi:10.1002/2016JD024942.

Logan, J. A. 1985. Tropospheric ozone - Seasonal behavior, trends, and anthropogenic influence. *J. Geophys. Res. Atmos.* 90 (ND6):10463–82. doi:10.1029/JD090iD06p10463.

Mills, G., F. Hayes, D. Simpson, L. Emberson, D. Norris, H. Harmens, and P. Büker. 2011. Evidence of widespread effects of ozone on crops and (semi-) natural vegetation in Europe (1990–2006) in relation to AOT40-and flux-based risk maps. *Glob. Chang. Biol.* 17 (1):592–613. doi:10.1111/j.1365-2486.2010.02217.x.

Niinemets, Ü., F. Loreto, and M. Reichstein. 2004. Physiological and physicochemical controls on foliar volatile organic compound emissions. *Trends Plant Sci.* 9 (4):180–86. doi:10.1016/j.tplants.2004.02.006.

Papiez, M. R., M. J. Potosnak, W. S. Goliff, A. B. Guenther, S. N. Matsunaga, and W. R. Stockwell. 2009. The impacts of reactive terpene emissions from plants on air quality in Las Vegas, Nevada. *Atmos. Environ.* 43 (27):4109–23. doi:10.1016/j.atmosenv.2009.05.048.

Riedlmeier, M., A. Ghirardo, M. Wenig, C. Knappe, K. Koch, E. Georgii, S. Dey, J. E. Parker, J.-P. Schnitzler, and A. C. Vlot. 2017. Monoterpenes support systemic acquired resistance within and between plants. *Plant Cell* 29 (6):1440–59. doi:10.1105/tpc.16.00898.

Seinfeld, J. H., and S. N. Pandis. 2016. *Atmospheric chemistry and physics: from air pollution to climate change*. Hoboken, NJ: John Wiley & Sons.

Sindelarova, K., C. Granier, I. Bouarar, A. Guenther, S. Tilmes, T. Stavrakou, J.-F. Müller, U. Kuhn, P. Stefani, and W. Knorr. 2014. Global data set of biogenic VOC emissions calculated by the MEGAN model over the last 30 years. *Atmos. Chem. Phys.* 14 (17):9317–41. doi:10.5194/acp-14-9317-2014.

Stockwell, W. R., H. Geiger, and K. H. Becker. 2001. Estimation of incremental reactivities for multiple day scenarios: an application to ethane and dimethyoxymethane. *Atmos. Environ.* 35 (5):929–39. doi:10.1016/S1352-2310(00)00354-X.

U.S.EPA. 1998. EPA/600-R-98/161. Technical assistance document for sampling and analysis of ozone precursors. NC, USA: U.S. Environmental Protection Agency.

U.S.EPA. 1999. Method TO-15. Determination of Volatile Organic Compounds (VOCs) in air collected in specially-prepared canisters and analyzed by Gas Chromatography/Mass Spectrometry (GC/MS)-Second Edition. EPA/625/R-96/010b, January. Cincinnati, OH: U. S. Environmental Protection Agency.

U.S.EPA. 2009. Technical assistance document for the national air toxics trends stations program. http://www.epa.gov/ttnamti1/files/ambient/airtox/nattsTADRevision2_508Compliant.pdf.

Wang, C.-T., C. Wiedinmyer, K. Ashworth, P. C. Harley, J. Ortega, and W. Vizuete. 2019. Leaf enclosure measurements for determining volatile organic compound

emission capacity from Cannabis spp. *Atmos. Environ.* 199:80–87. doi:10.1016/j.atmosenv.2018.10.049.

Wang, J.-L., C. Chew, C.-Y. Chang, W.-C. Liao, S.-C.-C. Lung, W.-N. Chen, P.-J. Lee, P.-H. Lin, and -C.-C. Chang. 2013. Biogenic isoprene in subtropical urban settings and implications for air quality. *Atmos. Environ.* 79:369–79. doi:10.1016/j.atmosenv.2013.06.055.

Wiß, F., A. Ghirardo, J. P. Schnitzler, C. Nendel, J. Augustin, M. Hoffmann, and R. Grote. 2017. Net ecosystem fluxes and composition of biogenic volatile organic compounds over a maize field–interaction of meteorology and phenological stages. *Gcb Bioenergy* 9 (11):1627–43. doi:10.1111/gcbb.12454.

Yang, Q., Y. Chen, Y. Shi, R. T. Burnett, K. M. McGrail, and D. Krewski. 2003. Association between ozone and respiratory admissions among children and the elderly in Vancouver, Canada. *Inhal. Toxicol.* 15 (13):1297–308. doi:10.1080/08958370390241768.

Footnote 7

CANNABIS ENVIRONMENTAL BEST MANAGEMENT PRACTICES GUIDE

AIR QUALITY

DENVER
PUBLIC HEALTH &
ENVIRONMENT

OCTOBER 2019

Cannabis plants naturally emit terpenes, which are volatile organic compounds (VOCs), as they grow. Marijuana Infused Product (MIP) facilities also emit VOCs from solvent evaporation during extraction processes. VOCs react with oxides of nitrogen in the presence of sunlight to create ground-level ozone, a pollutant that is dangerous to human health and the environment. Controlling emissions of VOCs from cultivation and MIP facilities helps improve air quality, which is especially important in urban areas and from May to September, when ground-level ozone levels often exceed health standards.

This guide provides recommended best management practices to improve air quality impacts and reduce VOC emissions from cannabis industry operations.

CARBON FILTRATION

Installing control technologies can reduce the amount of VOC emissions released from cultivation and MIP processes while simultaneously controlling odors. Carbon filtration is currently the best control technology for reducing VOC emissions from cannabis cultivation and MIP facilities. Best management practices for carbon filtration include:

- Design and invest in a carbon filtration system appropriate to your facility and don't exceed the maximum rated cubic feet-per-minute rating for air circulation through the filter.
- Choose a filter with a high VOC removal efficiency.
- Inspect and conduct regular maintenance of HVAC systems and carbon filters.
- Make sure that all operations are conducted within sealed infrastructure, and check regularly to ensure there are no leaks.
- Have a documented system in place to respond to odor complaints.
- Develop training for staff members to ensure best practices are being implemented as a part of the routine facility operating procedure.

In Denver, an odor ordinance requires that cultivation facilities control the odor impacts of their growing operations. Denver Revised Municipal Code, Chapter 4 – Air Pollution Control, Section 4-10.

SOLVENT EXTRACTION

Only certain solvents are permitted for use in Colorado MIP facilities: butane, propane, CO_2, ethanol, isopropanol, acetone, heptane and pentane. All but CO_2 release VOCs when they evaporate. The disposal of solvents by evaporation or spillage is prohibited. Best management practices for solvent extraction include:

- Regularly inspect all solvent storage devices and extraction system to prevent leaks.
- Be careful to prevent leaks during the transfer of solvents between containers and systems at all stages of the production processes.
- Ensure that solvent is always kept in a closed-loop extraction system or sealed container.
- Maintain an inventory of all solvents and their use over time.

Air quality regulations may apply to MIP facilities, depending on the annual amount of solvent lost to evaporation: www.colorado.gov/pacific/cdphe/greencannabis/air-quality

BENEFITS OF VOC/ODOR CONTROL

- Reduces community odor complaints and improves neighborhood relations.
- Improves public and environmental health by helping to reduce local ozone concentrations.
- Enhances your brand image with environmental stewardship.
- Helps to shift the cannabis industry at large toward sustainable and environmentally conscious business practices.

AIR QUALITY

INTRODUCTION

The cannabis industry directly impacts air quality in two predominant operations:

1. Plant growth cultivation
2. Marijuana Infused Product (MIP) facilities

At cultivation facilities, the natural growth of cannabis plants and other processes emit terpenes, which are Volatile Organic Compounds (VOCs) known for their strong odors. At MIP facilities, the evaporation of solvents and other processes in the production cycle results in Volatile Organic Compound (VOC) emissions. VOCs alone do not typically pose a direct threat to human health or the environment.

However, they do contribute to ground-level ozone by chemically reacting with other types of pollution, specifically, nitrogen oxides (NOx) in the presence of sunlight. Ozone is an air pollutant that is harmful to human health and negatively impacts the environment; therefore, it is important that the cannabis industry mitigate VOC emissions in their processes. This chapter provides recommended best management practices to improve air quality impacts and reduce VOC emissions from cannabis industry operations.

In Colorado's Front Range, cultivation and MIP facilities are generally in dense urban areas near heavily trafficked highways and other industrial sources of NOx pollution. Because VOCs require the presence of NOx and sunlight to form harmful ozone, VOCs from these facilities have a greater impact on ozone formation than facilities in rural areas. This makes mitigating VOC emissions from the cannabis industry especially important in these regions. Fortunately, most odor control practices at cultivation and MIP facilities also substantially reduce VOC emissions. The correct operation and maintenance of odor control systems at cultivation and MIP facilities is a best management practice for reducing air quality impacts from the cannabis industry.

SUSTAINABILITY

ASPECTS AND IMPACTS

- Odor control
- Regulatory compliance
- Indoor air quality
- Community relations
- Employee well-being
- Regional stakeholder alignment
- Operational and compliance budgets

CULTIVATION FACILITIES

As cannabis plants grow, they release a distinctive range of odors which are made up of different types of VOCs called terpenes.

Activities during the cultivation or production cycle that release significant odors also release elevated VOCs during that time. Installing control technologies can reduce the amount of VOC emissions released from the cultivation process and control odors in compliance with the Denver city and county odor ordinance. Highly reactive, ozone-forming terpenes commonly emitted from cannabis cultivation include: pinene, limonene, myrcene, and terpinolene.

CARBON FILTRATION - BEST OPTION FOR CONTROLLING ODORS AND VOCS

Carbon filtration is currently the best control technology for reducing VOC emissions from cannabis cultivation facilities. Carbon filters are simple to install, inexpensive, effective, and reliable when properly maintained and replaced. These filters work by using an absorption process where porous carbon surfaces chemically attract and trap VOCs along with other gas phase contaminants. As the filter ages, less carbon surface area is available to trap VOCs; at this point the filter will need to be replaced. Depending on the filter load, most carbon filters will last 6-12 months in a commercial cultivation environment and should be replaced according to the manufacturer's recommendations.

Carbon filters can operate as stand-alone units that clean and recirculate the air, or can be integrated into the HVAC system. Typically, carbon filters are at their peak performance when positioned at the highest point in your grow space where heat accumulates. High humidity levels hinder filter performance, so this control technology is better suited for facilities with environmental controls. An effective filtration system must be properly sized according to the space needed for volume and air-flow requirements. Maintaining an optimal environment can require multiple filters. Carbon filters can be used in combination with other odor control technologies.

Benefits:

- Improve indoor air quality by capturing airborne gas phase contaminants and odors.
- Control the odor impacts of the facility: A properly installed and maintained carbon filtration system is highly effective at controlling odors. This satisfies the requirements of the odor ordinance in Denver and improves community relations as well as business reputation.
- Control VOC emissions: a carbon filtration system will control odors and can remove VOC emissions. This improves public health and the environmental impacts of the facility.

Recommended best practices:

- Design and invest in a carbon filtration system that meets the specific needs of your facility. It is recommended that you work with an HVAC consultant with cannabis industry experience.
- Get information from the manufacturer about the effectiveness of the filter at removing VOCs and choose a filter with a high efficiency rate.
- Do not exceed the maximum rated cubic feet-per-minute rating for air circulation through the filter. If you exceed this max flow rate, the passing air will not have enough "contact time" with the carbon, and the filter will not be effective at removing VOCs.
- Regularly inspect your filter and replace the filter if it is releasing a smell near the filter effluent, or has reached its lifespan according to the manufacturer's specifications.
- Time your filter-replacement schedule so that filters are replaced in early May, the beginning of the ozone season. This ensures that the filter is at peak performance for VOC removal during the high ozone season, resulting in the greatest public health benefits.
- Using a pre-filter can help preserve the life span of your carbon filter, because it can capture particles before they take up surface area on the filter. Pre-filters should be replaced about every 6-8 months for proper air flow.

BIOFILTERS AND CHEMICAL ODOR TECHNOLOGY

Biofilters are an emerging odor technology that could prove to be more cost effective and less resource intensive than carbon filtration once it is refined in the future.

These filters use an organic medium, such as wood chips, that are inoculated with bacteria and consume odorous molecules. Research is currently being conducted on biofilters that contain bacteria that will consume terpenes and will not harm the cannabis plants. Biofiltration is successful at treating biodegradable VOCs, but it requires a large footprint and careful operation control.

Odor absorbing neutralizers: use oils and liquids from plant compounds and mist them into the exhaust air at cultivation facilities to neutralize odorous VOCs. Contact your odor control supplier about the effectiveness of VOC reduction, as it will vary (20%-90%) by product and contact time.

Masking and counteractive agents: use chemical odor control technologies that are misted at the cultivation facility's exhaust. The use of these agents is subject to Colorado's air quality regulations. Higher VOCs are associated with this technology, which lead to more severe impacts of air quality and are not recommended in urban areas.

Ozone generators: are mostly used for sanitization purposes and have also been used in industrial settings to control strong odors. These generators are harmful to humans and can damage or destroy crops because they are a direct emission source of ozone pollution; therefore, ozone generators are not recommended as a best practice for odor control.

Recommended best practices:

- Regularly inspect and perform maintenance checks on your HVAC system and ducting to ensure it is operating optimally and that the airflow is properly controlled. Keep windows and doors closed in cultivation areas, and inspect the infrastructure for potential leaks.
- For greenhouses, "sealing" the grow space and circulating inside air for one week's time is a common practice that allows the VOC concentration to build up within the greenhouse. When it is time to "purge" the greenhouse by bringing in fresh air, do this at a time when the potential for ozone formation is lowest (e.g., evenings, windy days, and cloudy days). Avoid purging air during times that have the highest risk of ozone formation (e.g., mornings, sunny and hot days, and stagnant weather).

- Make sure that the temperature and relative humidity are under control within tolerance levels of the cultivation room. High temperature and humidity will perpetuate any odor issues the facility is producing; this is especially true during the flowering phase of cultivation. Proper air circulation is critical for maintaining temperature and humidity control.
- Have a documented system in place for recording and responding to odor complaints in compliance with Denver's Odor Ordinance.
- Purchase a "scentometer" or Nasal Ranger to be able to quantify odors and record "defensible data" from self-testing. This can be used to determine if your operation is meeting local odor regulations.
- The harvesting phase results in a higher emission of VOCs than other cultivation phases. Time the harvesting phase to minimize its ozone impact, with respect to time of day, time of year and periods with high forecasted ozone. Minimize emissions during the morning and early afternoon, and during the summer.
- Develop training and allocate responsibilities for staff members to ensure best practices are being implemented consistently and continually as a part of the routine facility operating procedure.
- Communicate and coordinate with other cannabis cultivators to learn what solutions are the most practical and effective.

MIP FACILITIES AND EXTRACTION PROCESSES

MIP facilities manufacture marijuana concentrates and infused products such as edibles, ointments, and tinctures.

These methods can be divided into two main categories: solvent and solventless extractions. Solvent extraction methods apply a chemical to remove terpenes and cannabinoids from the plant, which results in a variety of different products. Solventless extraction methods involve the use of physical methods to create concentrates.

The processing of plants where solvents are used to extract cannabis concentrates is considered a manufacturing process that is subject to state air quality regulations. The applicability of the air quality regulations will depend on the annual amount of VOC emissions quantified in tons emitted per year. It is the responsibility of the business to calculate an estimate of their VOC emissions from solvent extraction. For specific guidance on air quality requirements for MIP facilities and how to calculate emissions, visit: **www.colorado.gov/cdphe/greencannabis**.

The Colorado Small Business Assistance Program can also help you calculate your annual air emissions for free by calling 303-692-3175.

Regulatory Applicability

- CCR 212-1 M 605 D4 requires a professional-grade, closed-loop extraction system capable of recovering the solvent, with the exception of ethanol and isopropanol solvent-based systems (CCR 212-1 M 605 E). The disposal of VOCs by evaporation or spillage is prohibited under 5 CCR 1001- 9 Regulation 7 V.A.
- CCR 212-2 R 605 A2 delineates the solvents that are permitted for use. The rule states: "A Retail Marijuana Products Manufacturing Facility may also produce Solvent-Based Retail Marijuana Concentrate using only the following solvents: butane, propane, CO_2, ethanol, isopropanol, acetone, heptane and pentane. The use of any other solvent is expressly prohibited unless and until it is approved by the Division."
- All permitted solvents besides CO_2 are VOC-based and result in direct VOC emissions when evaporated. The law is the same for medical marijuana concentrate production and is provided in CCR 212-1 M 605 A2. This list of solvents was formulated with the health and safety of workers in mind, and using any other solvent is a violation of the law and could also lead to negative air quality impacts. CCR 212-1 M 605 D5 requires that all solvents used are food grade or at least 99% pure.

Recommended best practices:

- Regularly inspect and maintain all storage devices of solvents to prevent leaks.
- Conduct regular maintenance and inspection of the extraction system to ensure that it is functioning properly, without direct leaks of the solvent.
- Take caution to prevent leaks during the transfer of solvents between containers and systems at all stages of the production processes.

SUSTAINABILITY

ASPECTS AND IMPACTS

Effluent discharge

Regulatory compliance

Indoor air quality

Energy consumption

GHG emissions

Water quality

Community relations

Employee well-being

Operational and compliance budgets

Climate

- Never dispose of a solvent through direct evaporation or spillage; ensure that the solvent is always recovered and kept in a closed-loop extraction system or designated container
- Maintain an inventory of all solvent liquids and ensure that the facility operating procedure allocates responsibility to keep an updated list.
- Develop training and allocate responsibilities for staff members to ensure best practices are being implemented consistently and continually as a part of the routine facility operating procedure

CONCLUSION

Limiting activities that emit VOCs and making sure that odor control systems are optimally operating during high ozone periods can substantially improve the air quality impacts of cannabis facilities. It is recommended that an employee committee is designated to develop and implement a BMP plan specific to the facility needs. Establishing and communicating BMPs through adequate training can help ensure that this becomes an integrated part of the routine operation in cannabis facilities. Colorado's cannabis industry can adopt BMPs that improve their air quality impacts, bolster their reputations as stewards of the environment, and control their odor, as well as air quality emissions.

DENVER
PUBLIC HEALTH &
ENVIRONMENT

denvergov.org/dphe

twitter.com/ddphe | facebook.com/denverenvironmentalquality

Footnote 8

EPA United States Environmental Protection Agency

Green Book

Contact Us

- 8-Hour Ozone (2015)
- 8-Hour Ozone (2008)
- 8-Hour Ozone (1997)
- 1-Hour Ozone (1979)
- PM-2.5 (2012)
- PM-2.5 (2006)
- PM-2.5 (1997)
- PM-10 (1987)
- Sulfur Dioxide (2010)
- Sulfur Dioxide (1971)
- Lead (2008)
- Lead (1978)
- Carbon Monoxide (1971)
- Nitrogen Dioxide (1971)
- Multi-Pollutant
- Downloads
- FAQ
- Related Links
- Recent Updates

You are here: EPA Home > Green Book > 8-Hour Ozone (2015) Area Map

View PDF map that can be zoomed

California 8-hour Ozone Nonattainment Areas (2015 Standard)

08/31/2021

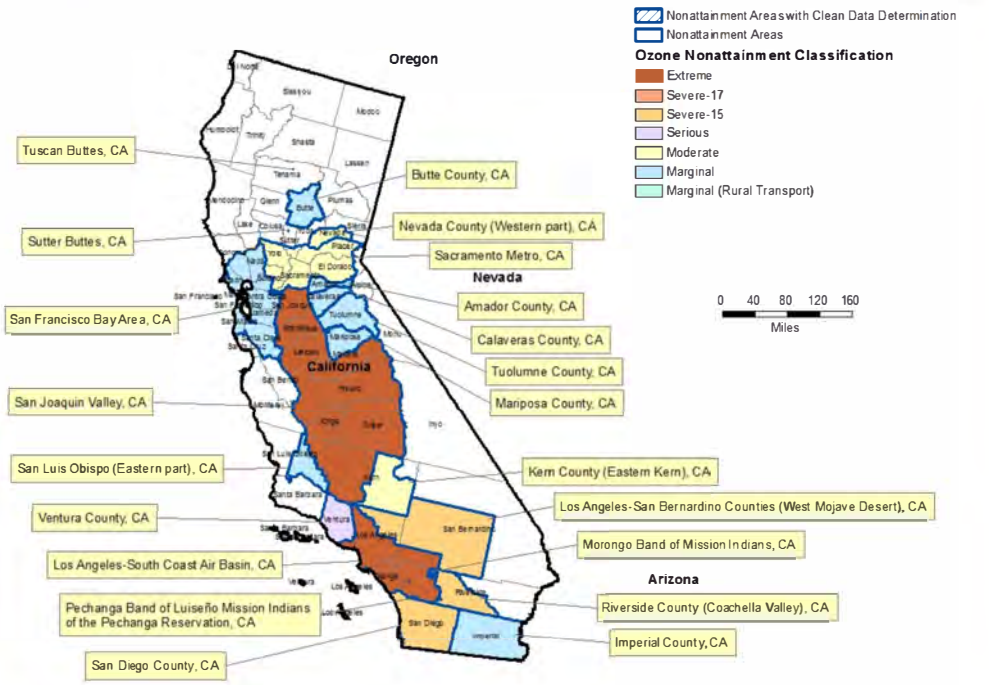


Figure 16.6a HYSPLIT Back Trajectories for Clovis – N. Villa Ave. (06-019-5001).

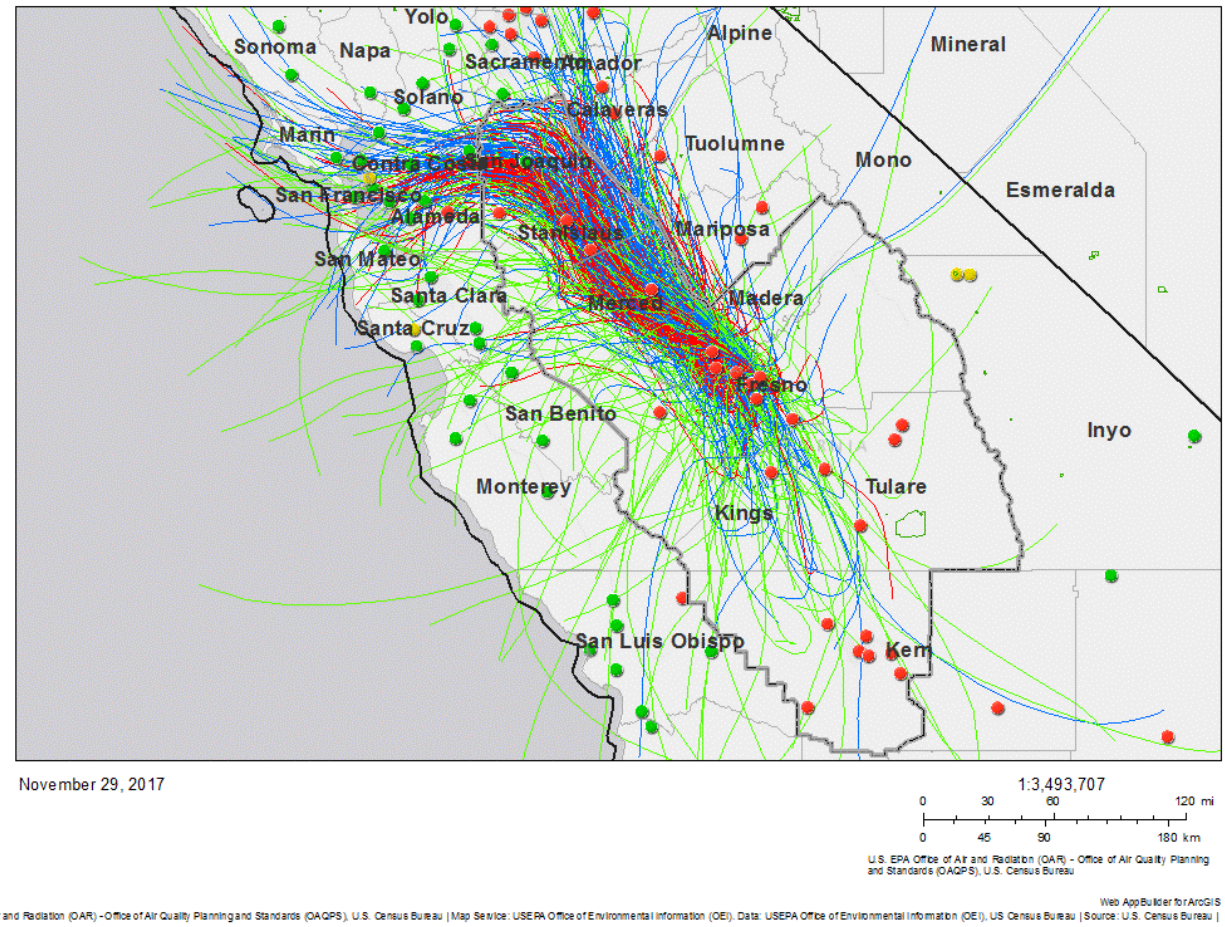


Figure 16.6a shows HYSPLIT back-trajectories starting at 100 (red lines), 500 (green lines), and 1000 (blue lines) meters above ground level, respectively. Trajectories extend back in time 24 hours from 6 p.m. on the day of the exceedance. The EPA's intended nonattainment boundary for San Joaquin Valley, CA is shown as a gray line with a dashed black center. Monitors are shown as red (violating), green (attaining), or yellow (invalid) dots based on 2014-2016 design values. Tribal land boundaries are outlined in green. Please refer to the master legend near the beginning of this document.

Figure 16.6b HYSPLIT Back Trajectories for Bakersfield - Muni (06-029-2012).

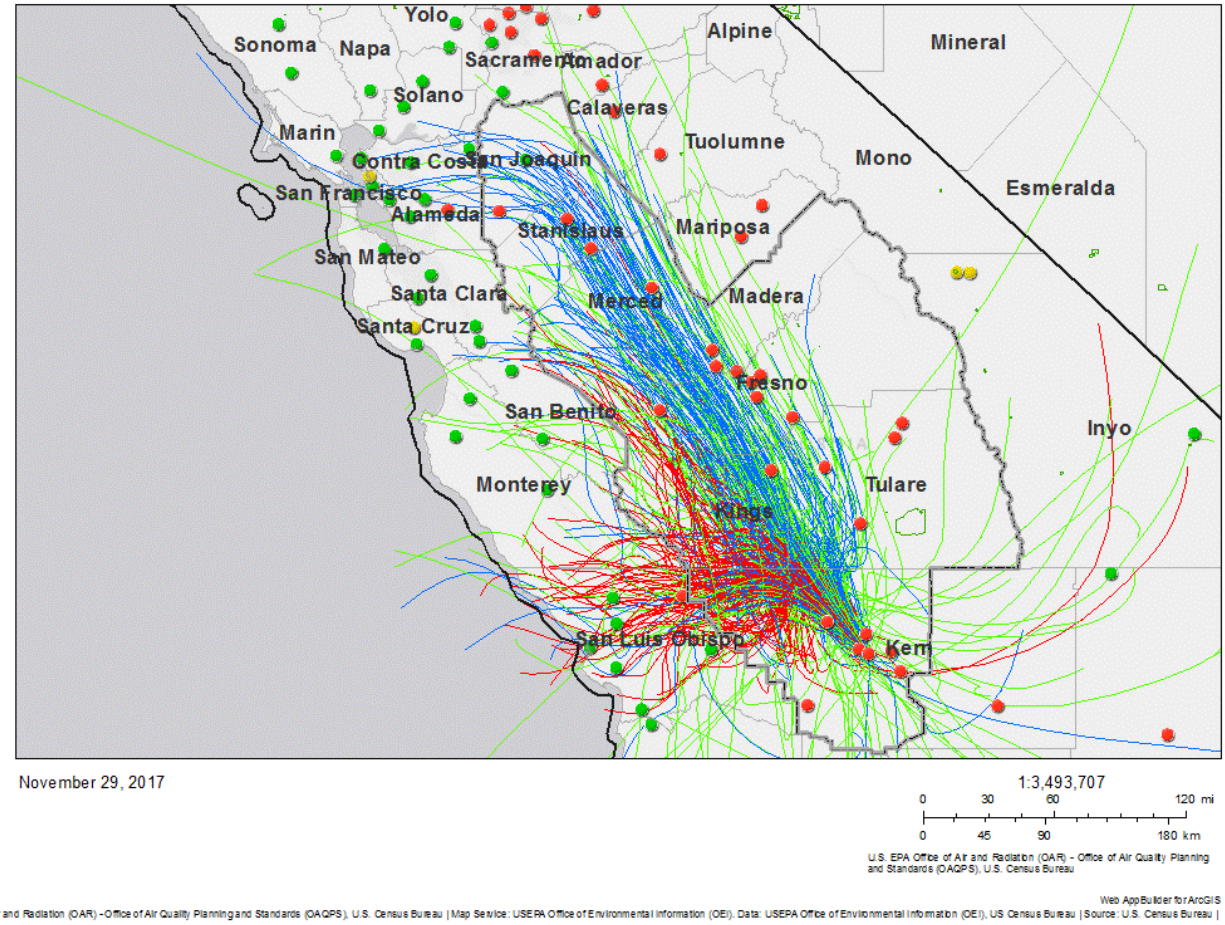


Figure 16.6b shows HYSPLIT back-trajectories starting at 100 (red lines), 500 (green lines), and 1000 (blue lines) meters above ground level, respectively. Trajectories extend back in time 24 hours from 6 p.m. on the day of the exceedance. The EPA's intended nonattainment boundary for San Joaquin Valley, CA is shown as a gray line with a dashed black center. Monitors are shown as red (violating), green (attaining), or yellow (invalid) dots based on 2014-2016 design values. Tribal land boundaries are outlined in green. Please refer to the master legend near the beginning of this document.

Figure 16.6c HYSPLIT Back Trajectories for Corcoran (06-031-1004).

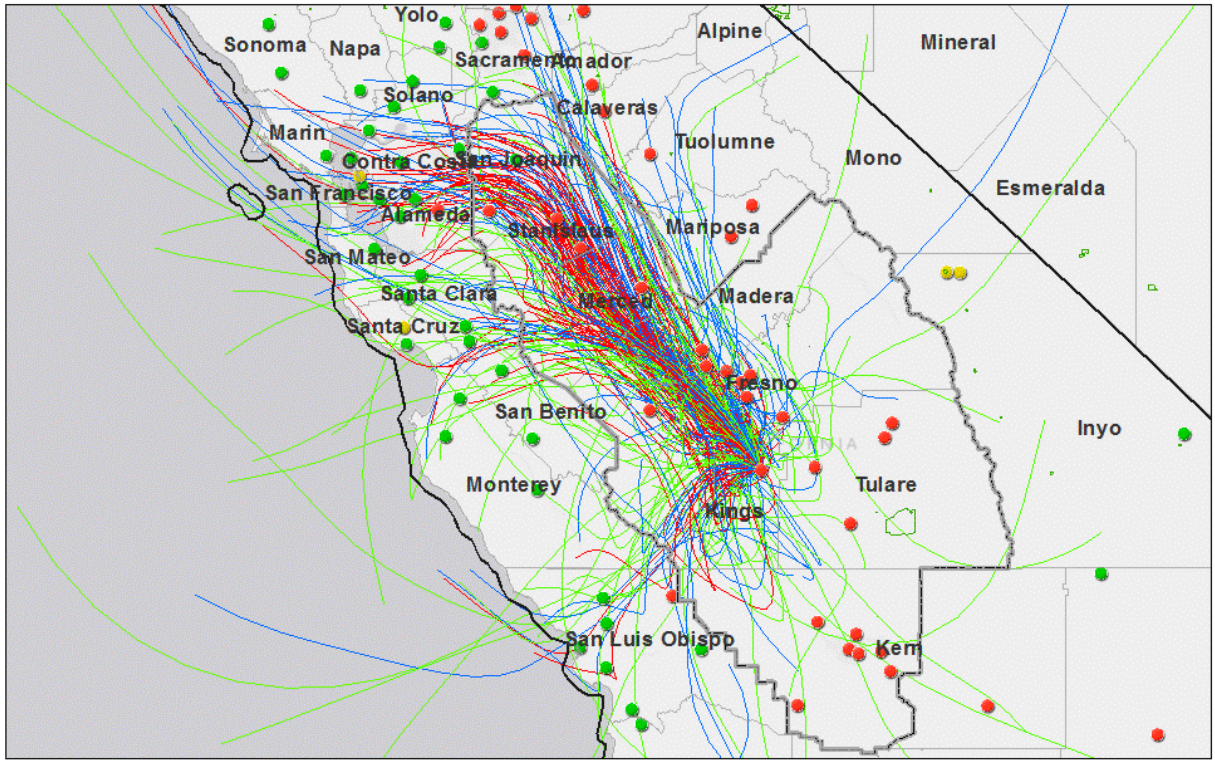


Figure 16.6c shows HYSPLIT back-trajectories starting at 100 (red lines), 500 (green lines), and 1000 (blue lines) meters above ground level, respectively. Trajectories extend back in time 24 hours from 6 p.m. on the day of the exceedance. The EPA's intended nonattainment boundary for San Joaquin Valley, CA is shown as a gray line with a dashed black center. Monitors are shown as red (violating), green (attaining), or yellow (invalid) dots based on 2014-2016 design values. Tribal land boundaries are outlined in green. Please refer to the master legend near the beginning of this document.

Figure 16.6e HYSPLIT Back Trajectories for Merced – S. Coffee Ave. (06-047-0003).

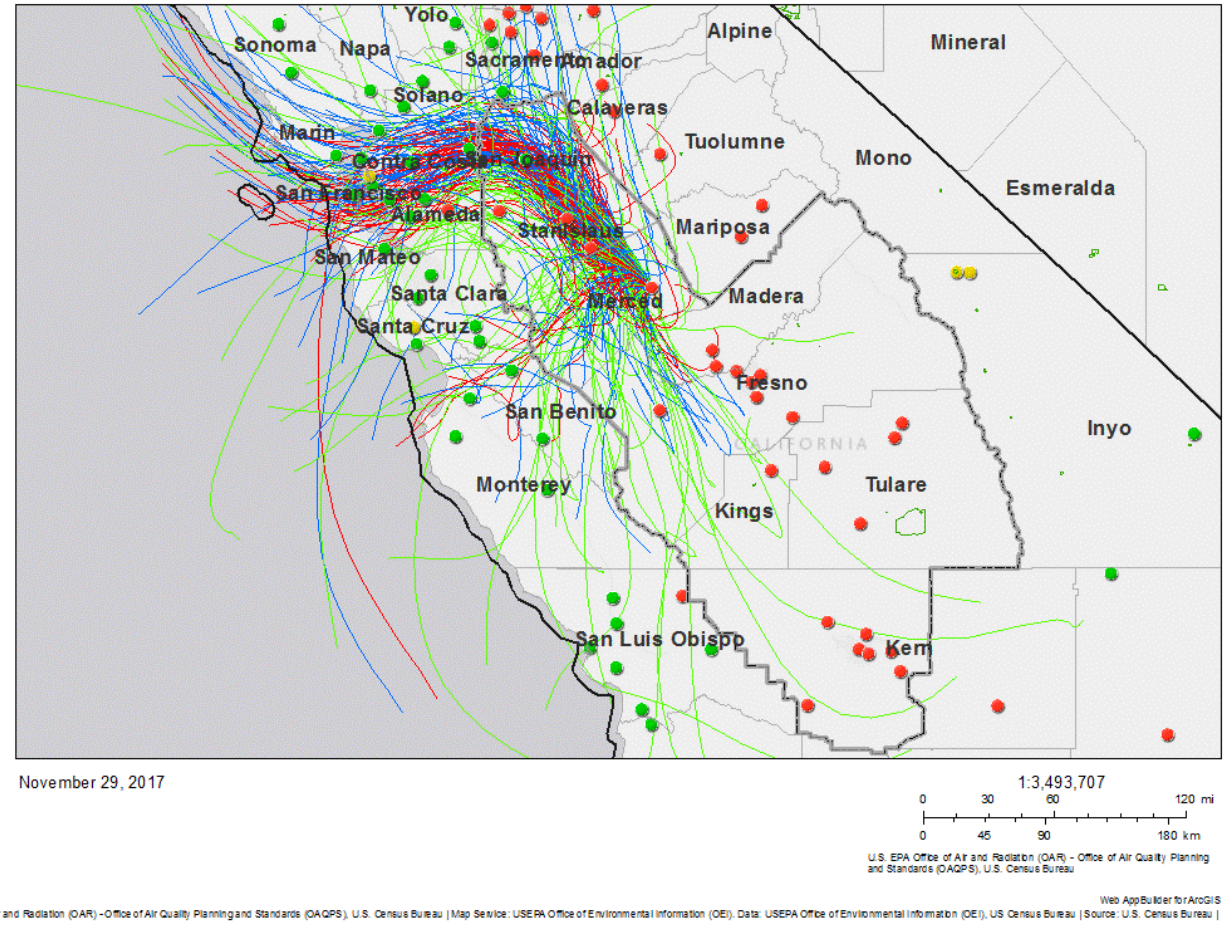


Figure 16.6e shows HYSPLIT back-trajectories starting at 100 (red lines), 500 (green lines), and 1000 (blue lines) meters above ground level, respectively. Trajectories extend back in time 24 hours from 6 p.m. on the day of the exceedance. The EPA's intended nonattainment boundary for San Joaquin Valley, CA is shown as a gray line with a dashed black center. Monitors are shown as red (violating), green (attaining), or yellow (invalid) dots based on 2014-2016 design values. Tribal land boundaries are outlined in green. Please refer to the master legend near the beginning of this document.

Figure 16.6h HYSPLIT Back Trajectories for Sequoia – Ash Mountain (06-107-0009).

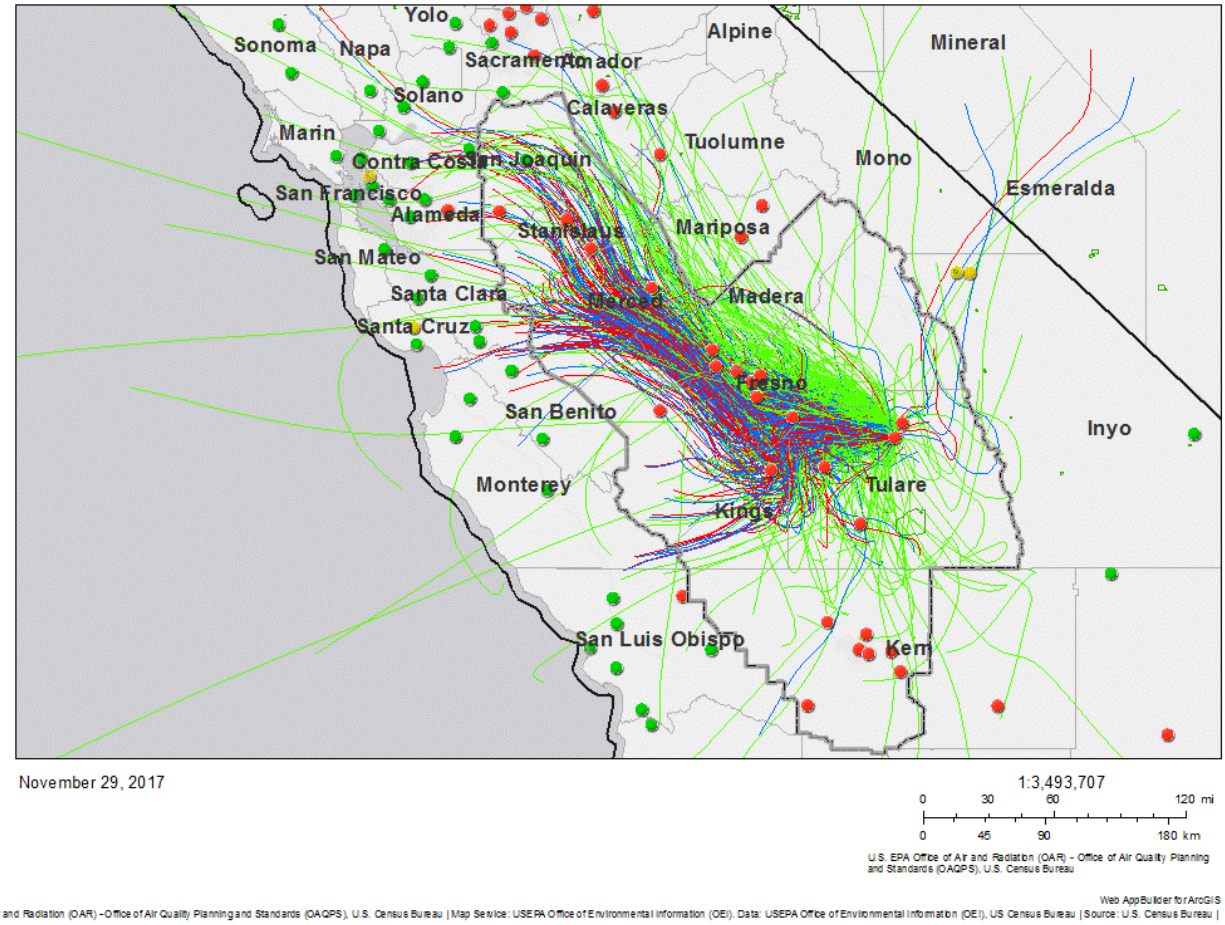


Figure 16.6h shows HYSPLIT back-trajectories starting at 100 (red lines), 500 (green lines), and 1000 (blue lines) meters above ground level, respectively. Trajectories extend back in time 24 hours from 6 p.m. on the day of the exceedance. The EPA's intended nonattainment boundary for San Joaquin Valley, CA is shown as a gray line with a dashed black center. Monitors are shown as red (violating), green (attaining), or yellow (invalid) dots based on 2014-2016 design values. Tribal land boundaries are outlined in green. Please refer to the master legend near the beginning of this document.

The EPA's HYSPLIT analysis shows that the winds during exceedance days are predominately from the north-northwest. This is consistent with the geographic orientation of the San Joaquin Valley and its relationship to the Golden Gate (at the mouth of San Francisco Bay), the key route for air flow between the Pacific Ocean and the Central Valley of California.

The San Joaquin Valley 2007 Ozone Plan[7] includes a conceptual description of ozone formation in the area. The Sierra Nevada, Tehachapi, and South Coast mountain ranges that surround the San Joaquin Valley on the east, south, and west, restrict air flow and ventilation. The summers are hot with little rainfall or cloud cover, and with frequent inversions that trap pollutants below them. Sea breezes (or "marine flows") may bring pollutants from coastal areas into the San Joaquin Valley from the northwest. Recirculation of San Joaquin Valley pollutants can occur via nighttime drainage winds ("slope flows"), which return pollutants that were transported up into mountain valleys during the day. Recirculation can also occur via the "Fresno eddy," a counterclockwise flow that returns polluted air

[7] "Photochemical Modeling Protocol for Developing Strategies to Attain the Federal 8-hour Ozone Air Quality Standard in Central California," California Air Resources Board, May 22, 2007; included as Appendix C to the ARB Staff Report. See especially pp.6-8. Available at http://www.arb.ca.gov/planning/sip/2007sip/sjv8hr/sjvozone.htm

State of California
Office of Administrative Law

In re:
Air Resources Board

Regulatory Action:

Title 17, California Code of Regulations

Adopt sections:
Amend sections: 60201
Repeal sections:

NOTICE OF APPROVAL OF CHANGES WITHOUT REGULATORY EFFECT

California Code of Regulations, Title 1, Section 100

OAL Matter Number: 2017-0303-02

OAL Matter Type: Nonsubstantive (N)

This action by the California Air Resources Board makes changes without regulatory effect section 60201 in Title 17 of the California Code of Regulations. Specifically, this action lists the counties within the South Central Coast Air Basin: Santa Barbara, San Luis Obispo, and Ventura. This action further changes the designation of the Santa Barbara county area from "Nonattainment" to "Nonattainment-Transitional."

OAL approves this change without regulatory effect as meeting the requirements of California Code of Regulations, Title 1, section 100.

Date: April 17, 2017

Thanh Huynh
Senior Attorney

For: Debra M. Cornez
Director

Original: Richard W. Corey
Copy: Trini Balcazar

STATE OF CALIFORNIA--OFFICE OF ADMINISTRATIVE LAW

NOTICE PUBLICATION/REGULATIONS SUBMISSION

NONSUBSTANTIVE

(See instructions on reverse)

For use by Secretary of State only

STD. 400 (REV. 01-2013)

OAL FILE NUMBERS	NOTICE FILE NUMBER	REGULATORY ACTION NUMBER	EMERGENCY NUMBER
	Z-2017-	2017-0303-02N	

For use by Office of Administrative Law (OAL) only

2017 MAR -3 P 3:20

OFFICE OF ADMINISTRATIVE LAW

NOTICE | REGULATIONS

ENDORSED - FILED
in the office of the Secretary of State
of the State of California
APR 17 2017
2:51 PM

AGENCY WITH RULEMAKING AUTHORITY
AIR RESOURCES BOARD

AGENCY FILE NUMBER (If any)

A. PUBLICATION OF NOTICE (Complete for publication in Notice Register)

1. SUBJECT OF NOTICE	TITLE(S)	FIRST SECTION AFFECTED	2. REQUESTED PUBLICATION DATE

3. NOTICE TYPE	4. AGENCY CONTACT PERSON	TELEPHONE NUMBER	FAX NUMBER (Optional)
☐ Notice re Proposed Regulatory Action ☐ Other			

OAL USE ONLY	ACTION ON PROPOSED NOTICE	NOTICE REGISTER NUMBER	PUBLICATION DATE
	☐ Approved as Submitted ☐ Approved as Modified ☐ Disapproved/ Withdrawn		

B. SUBMISSION OF REGULATIONS (Complete when submitting regulations)

1a. SUBJECT OF REGULATION(S)	1b. ALL PREVIOUS RELATED OAL REGULATORY ACTION NUMBER(S)
Area Designations for Ozone	

2. SPECIFY CALIFORNIA CODE OF REGULATIONS TITLE(S) AND SECTION(S) **(Including title 26, if toxics related)**

SECTION(S) AFFECTED (List all section number(s) individually. Attach additional sheet if needed.)	ADOPT	
	AMEND	60201,
TITLE(S) 17	REPEAL	

3. TYPE OF FILING

- ☐ Regular Rulemaking (Gov. Code §11346)
- ☐ Resubmittal of disapproved or withdrawn nonemergency filing (Gov. Code §§11349.3, 11349.4)
- ☐ Emergency (Gov. Code, §11346.1(b))
- ☐ Certificate of Compliance: The agency officer named below certifies that this agency complied with the provisions of Gov. Code §§11346.2-11347.3 either before the emergency regulation was adopted or within the time period required by statute.
- ☐ Resubmittal of disapproved or withdrawn emergency filing (Gov. Code, §11346.1)
- ☐ Emergency Readopt (Gov. Code, §11346.1(h))
- ☐ File & Print
- ☐ Other (Specify) _____
- ☒ Changes Without Regulatory Effect (Cal. Code Regs., title 1, §100)
- ☐ Print Only

4. ALL BEGINNING AND ENDING DATES OF AVAILABILITY OF MODIFIED REGULATIONS AND/OR MATERIAL ADDED TO THE RULEMAKING FILE (Cal. Code Regs. title 1, §44 and Gov. Code §11347.1)
N/A

5. EFFECTIVE DATE OF CHANGES (Gov. Code, §§ 11343.4, 11346.1(d); Cal. Code Regs., title 1, §100)

- ☐ Effective January 1, April 1, July 1, or October 1 (Gov. Code §11343.4(a))
- ☐ Effective on filing with Secretary of State
- ☒ §100 Changes Without Regulatory Effect
- ☐ Effective other (Specify) _____

6. CHECK IF THESE REGULATIONS REQUIRE NOTICE TO, OR REVIEW, CONSULTATION, APPROVAL OR CONCURRENCE BY, ANOTHER AGENCY OR ENTITY

- ☐ Department of Finance (Form STD. 399) (SAM §6660)
- ☐ Fair Political Practices Commission
- ☐ State Fire Marshal
- ☐ Other (Specify)

7. CONTACT PERSON	TELEPHONE NUMBER	FAX NUMBER (Optional)	E-MAIL ADDRESS (Optional)
Trini Balcazar, Regulations Coordinator	916 445-9564	916 322-3928	trinidad.balcazar@arb.ca.gov

8. **I certify that the attached copy of the regulation(s) is a true and correct copy of the regulation(s) identified on this form, that the information specified on this form is true and correct, and that I am the head of the agency taking this action, or a designee of the head of the agency, and am authorized to make this certification.**

SIGNATURE OF AGENCY HEAD OR DESIGNEE — DATE: 2/27/2017

TYPED NAME AND TITLE OF SIGNATORY
Richard W. Corey, Executive Officer

For use by Office of Administrative Law (OAL) only

ENDORSED APPROVED
APR 17 2017
Office of Administrative Law

Final Regulation Order

AREA DESIGNATIONS FOR STATE AMBIENT AIR QUALITY STANDARDS
Chapter 1. Air Resources Board
Subchapter 1.5. Air Basins and Air Quality Standards
Article 1.5 Area Pollutant Designations

[Note: The preexisting regulation text is set forth below in normal type. The amendments are shown in *underline italics* to indicate additions and ~~strikeout~~ to indicate deletions.]

Amend sections 60201 title 17, California Code of Regulations, to read as follows:

§ 60201. Table of Area Designations for Ozone.

Area	***Designation***
North Coast Air Basin	Attainment
San Francisco Bay Area Air Basin	Nonattainment
North Central Coast Air Basin	Nonattainment-Transitional
South Central Coast Air Basin	~~Nonattainment~~
Santa Barbara County	*Nonattainment-Transitional*
San Luis Obispo and Ventura Counties	*Nonattainment*
South Coast Air Basin	Nonattainment
San Diego Air Basin	Nonattainment
Northeast Plateau Air Basin	Attainment
Sacramento Valley Air Basin	
Colusa and Glenn Counties	Attainment
Sutter and Yuba Counties	Nonattainment-Transitional
Butte, Shasta, and Tehama Counties	Nonattainment
Placer, Sacramento, Solano, and Yolo Counties	Nonattainment
San Joaquin Valley Air Basin	Nonattainment
Great Basin Valleys Air Basin	
Alpine County	Unclassified
Inyo County	Nonattainment
Mono County	Nonattainment

§ 60201. Table of Area Designations for Ozone. (continued)

Area	*Designation*
Mojave Desert Air Basin	Nonattainment
Salton Sea Air Basin	Nonattainment
Mountain Counties Air Basin	
Amador, Calaveras, El Dorado, Nevada, Placer, Mariposa, and Tuolumne Counties	Nonattainment
Plumas and Sierra Counties	Unclassified
Lake County Air Basin	Attainment
Lake Tahoe Air Basin	Nonattainment-Transitional

NOTE: Authority cited: Sections 39600, 39601 and 39608, Health and Safety Code. Reference: Sections 39608 and 40925.5, Health and Safety Code.

FINAL REGULATION ORDER

CALIFORNIA CODE OF REGULATIONS
Title 17. Public Health
Division 3. Air Resources Board
Chapter 1. Air Resources Board
Subchapter 1.5. Air Basins and Air Quality Standards
Article 1.5 Area Pollutant Designations

Amend section 60201, title 17, California Code of Regulations to read as follows:

[Note: Additions are shown as *underline italics* and deletions as ~~strikeout~~.]

§ 60201. Table of Area Designations for Ozone.

Area	***Designation***
North Coast Air Basin	Attainment
San Francisco Bay Area Air Basin	Nonattainment
North Central Coast Air Basin	Nonattainment-Transitional
South Central Coast Air Basin	
Santa Barbara County	~~Nonattainment-Transitional~~*Attainment*
San Luis Obispo and Ventura Counties	Nonattainment
South Coast Air Basin	Nonattainment
San Diego Air Basin	Nonattainment
Northeast Plateau Air Basin	Attainment
Sacramento Valley Air Basin	
Colusa and Glenn Counties	Attainment
Sutter and Yuba Counties	
Sutter Buttes	Nonattainment
Remainder of Sutter and Yuba Counties	~~Attainment~~*Nonattainment*
Butte, Shasta, and Tehama Counties	Nonattainment
Placer and Sacramento Counties	Nonattainment
Solano and Yolo Counties	Nonattainment-Transitional
San Joaquin Valley Air Basin	Nonattainment
Great Basin Valleys Air Basin	
Alpine County	Unclassified
Inyo County	Nonattainment
Mono County	Nonattainment
Mojave Desert Air Basin	Nonattainment
Salton Sea Air Basin	Nonattainment
Mountain Counties Air Basin	
Amador, Calaveras, El Dorado, Nevada, Placer, Mariposa, and Tuolumne Counties	Nonattainment

Plumas and Sierra Counties	Unclassified
Lake County Air Basin	Attainment
Lake Tahoe Air Basin	Attainment

NOTE: Authority cited: Sections 39600, 39601 and 39608, Health and Safety Code. Reference: Sections 39608 and 40925.5, Health and Safety Code.

Final Regulation Order

Amend sections 60201 and 60210, title 17, California Code of Regulations, to read as follows:

[Note: The proposed amendments are shown in underline to indicate additions and ~~strikeout~~ to indicate deletions from the existing regulatory text.]

§ 60201. Table of Area Designations for Ozone.

Area	Designation
North Coast Air Basin	Attainment
San Francisco Bay Area Air Basin	Nonattainment
North Central Coast Air Basin	~~Nonattainment-Transitional~~Attainment
South Central Coast Air Basin	
Santa Barbara County	~~Attainment~~Nonattainment
San Luis Obispo and Ventura Counties	Nonattainment
South Coast Air Basin	Nonattainment
San Diego Air Basin	Nonattainment
Northeast Plateau Air Basin	Attainment
Sacramento Valley Air Basin	
Shasta	Nonattainment-Transitional
Colusa and Glenn Counties	Attainment
Sutter and Yuba Counties	
Sutter Buttes	Nonattainment
Remainder of Sutter and Yuba Counties	Nonattainment
Butte, Shasta, and Tehama Counties	Nonattainment
Placer and Sacramento Counties	Nonattainment
Solano and Yolo Counties	Nonattainment-Transitional
San Joaquin Valley Air Basin	Nonattainment
Great Basin Valleys Air Basin	
Alpine County	Unclassified
Inyo County	Nonattainment
Mono County	Nonattainment
Mojave Desert Air Basin	Nonattainment
Salton Sea Air Basin	Nonattainment
Mountain Counties Air Basin	
Amador County	Nonattainment-Transitional
~~Amador,~~ Calaveras, El Dorado, Nevada, Placer, Mariposa, and Tuolumne Counties	Nonattainment
Plumas and Sierra Counties	Unclassified
Lake County Air Basin	Attainment
Lake Tahoe Air Basin	Attainment

Note: Authority cited: sections 39600, 39601, and 39608, Health and Safety Code. Reference: sections 39608 and 40925.5, Health and Safety Code.

§ 60210. Table of Area Designations for Fine Particulate Matter ($PM_{2.5}$).

Area	Designation
North Coast Air Basin	Attainment
San Francisco Bay Area Air Basin	Nonattainment
North Central Coast Air Basin	Attainment
South Central Coast Air Basin	
San Luis Obispo County	Attainment
Santa Barbara County	Unclassified
Ventura County	Attainment
South Coast Air Basin	Nonattainment
San Diego Air Basin	Nonattainment
Northeast Plateau Air Basin	Attainment
Sacramento Valley Air Basin	
Butte County	Nonattainment
Colusa, Glenn, Placer, Sutter and Yuba Counties	Attainment
Sacramento County	Attainment
Shasta County	Attainment
Remainder of Air Basin	Unclassified
San Joaquin Valley Air Basin	Nonattainment
Great Basin Valleys Air Basin	Attainment
Mojave Desert Air Basin	
San Bernardino County	
County Portion of federal Southeast Desert Modified AQMA for Ozone[1]	Attainment
Remainder of San Bernardino County and Kern, Los Angeles, and Riverside Counties	~~Unclassified~~Attainment
Salton Sea Air Basin	
Imperial County	
City of Calexico[2]	Nonattainment
Remainder of Imperial County and Riverside County	Attainment
Mountain Counties Air Basin	
Plumas County	
Portola Valley[3]	Nonattainment
Remainder of Plumas County and Amador, Calaveras, El Dorado, Mariposa, Nevada, Placer, Sierra, and Tuolumne Counties	Unclassified
Lake County Air Basin	Attainment
Lake Tahoe Air Basin	Attainment

[1] section 60200(b)
[2] section 60200(a)
[3] section 60200(c)

Note: Authority cited: sections 39600, 39601 and 39608, Health and Safety Code. Reference: section 39608, Health and Safety Code.

apcd air pollution control district
SANTA BARBARA COUNTY

February 19, 2021

Clerk of the Board
California Air Resources Board
1001 I Street
Sacramento, California 95814

Re: Proposed 2020 Amendments to Area Designations for State Ambient Air Quality Standards

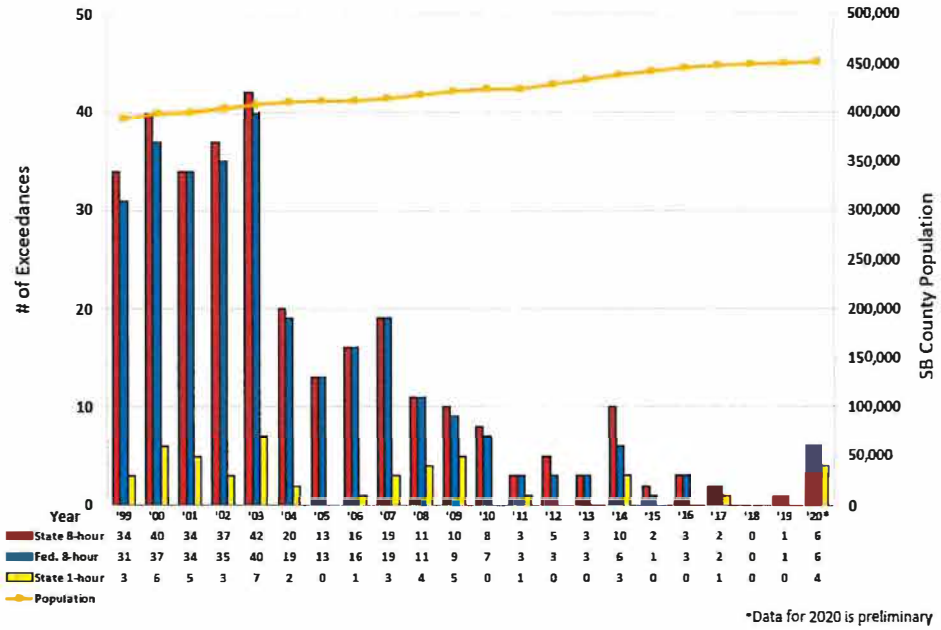
Dear Chair Randolph and Members of the Board,

Santa Barbara County Air Pollution Control District (District) appreciates the opportunity to comment on the California Air Resources Board (CARB) Proposed 2020 Amendments to the Area Designations for State Ambient Air Quality Standards.

In 2019, we were pleased that, after decades of hard work and progress, Santa Barbara County was designated attainment for the State 8-hour ozone standard. We were cautiously optimistic that through all the measures being implemented locally and statewide, we could maintain that status into the future. However, we are aware that weather and air pollutant emissions vary, leading to different pollutant concentration outcomes from one year to the next. Unfortunately, two values recorded in 2019 that are now included in the three-year data set (2017 to 2019) have led to a change in designation back to nonattainment, as indicated in CARB staff proposal.

The District has rigorously followed the triennial air quality plan and update schedule to achieve and maintain the ozone standard by the earliest practicable date, as required by the California Clean Air Act. The local ozone plans serve as our roadmap to develop cost-effective rules and programs to reduce ozone precursors from local sources. Local rules have been adopted, implemented, and enforced to expeditiously attain the State ozone standard. While emissions from stationary sources make up 12% of the total ozone precursor emissions in Santa Barbara County, it is imperative that our local efforts are well supported by CARB's steadfast actions to reduce emissions from sources outside the District's regulatory control such as mobile and area sources.

Over time, the number of exceedances of the State ozone standard in Santa Barbara County has greatly dropped, while population continues to grow. The chart to the right is a great illustration of the success achieved when appropriate steps are taken at both the local and state levels. With



*Data for 2020 is preliminary

Aeron Arlin Genet, Air Pollution Control Officer

805.961.8800 260 N. San Antonio Rd., Ste. A Santa Barbara, CA 93110 ourair.org @OurAirSBC

the high of 42 exceedances of the State ozone standard in 2003, the District measured a significant reduction in number of ozone exceedances in the 17 years that followed – to the point in 2018 when no exceedances were measured. To maintain this level of success, CARB's continued efforts to reduce emissions from mobile sources is imperative.

The wildfire impacts that California experienced in the late summer and fall of 2020 were a harsh reminder that weather, climate, and other conditions outside of our control can lead to unhealthy air quality, even when the fires are not occurring in our region. As directed by California Senate Bill 1260 and in coordination with other local agencies, the District has facilitated prescribed burning in strategic locations in Santa Barbara County, with the long-term goal of avoiding catastrophic wildfires. The District also works with CARB to provide a regional cache of portable air quality monitors available for deployment during prescribed burns. Although these efforts have been successful, we acknowledge that there is a long way to go, and we will continue to partner with state and local agencies to improve outcomes. During the 2020 wildfires, the District measured both particulate matter and ozone levels that exceeded state and/or federal air quality standards. The District deeply appreciates CARB's willingness to work with air districts to demonstrate that these measurements qualify as exceptional events that were affected by catastrophic wildfires.

The District requests CARB's full support and partnership in addressing our common air quality goals. While CARB's staff report for the proposed 2020 amendments to area designations characterizes the overall fiscal impact to the District to be relatively minimal over the three-year period, it must be noted that the District is already implementing many other responsibilities without additional revenue. To be specific, CARB recently decided to close two air monitoring stations in Santa Barbara County that provide valuable air quality information for the highest populated regions of the county. In response, the District worked to reallocate resources and take over the ongoing operation, quality assurance, and data submittal for these monitoring stations without any additional revenue to cover this new expense. Another example is CARB's newly adopted Regulation for the Reporting of Criteria Air Pollutants and Toxic Air Contaminants that will result in additional staff time to implement. Once again, the District is required to take on additional responsibilities without additional revenue to compensate for staff time.

Voluntary programs are an important tool to achieve near-term emission reductions from mobile sources, such as ocean-going vessels and on-road and off-road vehicles. However, they require significant funding and staff resources. We request your support to identify funding that will allow the District to successfully implement these critical programs. Together, we will work to both attain and maintain state and federal ambient air quality standards, to help the community better understand emission sources and air quality issues, and to protect our diverse populations from the effects of air pollution.

Sincerely,

Aeron Arlin Genet
Air Pollution Control Officer

cc: Richard Corey, CARB Executive Officer
Edie Chang, CARB Deputy Executive Officer

EXHIBIT 3

Law Office of Kim McCormick, PLLC

Memorandum

Date: December 3, 2021

To: Marshall Miller, Courtney Taylor

From: Kim McCormick

Re: Federal Endangered Species Act Steelhead Issue Associated With Proposed Canna Rios, LLC Cannabis Cultivation Project

Facts

Proposed Compost and Waste Areas

On May 7, 2021, the Santa Barbara County Planning Commission denied an appeal filed by Bien Nacido Vineyards, L.P. (Bien Nacido), among others, of Planning Director approval on February 8, 2021, of a Land Use Permit (LUP) for the Canna Rios, LLC Cannabis Cultivation Project (Project). The Project is located adjacent to and west of the Bien Nacido Vineyards on 245.46 acres of a 431.22-acre legal lot.

According to the Project description and Overall Site Plan and Project Information Sheet P1, filed by the Project applicant, a 0.76-acre waste and compost storage area is proposed to be located 200 feet from the area where the Cuyama and Sisquoc Rivers converge to form the Santa Maria River. However, there is no description of how this area will be constructed or managed, or any measures that will be taken to ensure that waste and compost runoff does not flow into the Santa Maria River.

Steelhead (*Oncorhynchusmykiss*) use the Santa Maria River, which are listed as endangered under the federal Endangered Species Act, 16 U.S.C. Section 1531 et seq. (ESA). *See* 62 Fed. Reg. 43937 (August 18, 1997); 71 Fed. Reg. 833 (January 5, 2006); and 79 Fed. Reg. 20802 (April 14, 2014). The Santa Maria River is designated under the ESA as critical habitat for steelhead, so it is essential that the County analyze the potential for material from the proposed compost and waste storage area to reach the Santa Maria River and/or cause harm to steelhead. Such an analysis is necessary to satisfy both County land use code regulations and the California Environmental Quality Act (CEQA), which requires analysis of potential impacts to all federal and state protected species.

3920 Southern Cross Road NE, Bainbridge, WA 98110
(206) 780 9064 (tel.); 206) 910 4772 (cel)
Kimberly.mccormick@comcast.net

Project Condition #16 and Findings

On May 5, 2021, the Planning Commission approved Case No. LUP-00000-00116, including the compost and waste areas, subject to conditions included as Attachment B. The County Findings for the Project, Attachment B Conditions of Approval, include Condition 16 Cannabis Waste Discharge Requirements, which states: "The applicant shall demonstrate compliance with the State Water Resource Control Board's comprehensive Cannabis Cultivation Policy which includes principles and guidelines for cannabis cultivation, including regulations on the use of pesticides, rodenticides, herbicides, insecticides, fungicides, disinfectants and fertilizers. The applicant shall demonstrate compliance with the State Water Resources Control Board's comprehensive Cannabis Cultivation Policy prior to approval of the Land Use Permit."

However, the Project description does not include any explanation or analysis of potential impacts of the compost and waste areas to steelhead in the Santa Maria River, or any discussion of the proposed construction and operation of the waste and compost storage areas. There is no discussion of potential impacts to steelhead in any of the documents submitted to or considered by the Planning Commission. Further, the Project site plans were revised in October 2021, after the Planning Commission hearing, which rotated the compost and waste areas such that they are now closer to the Santa Maria River. This affects the validity of both the Planning Commission approval and compliance with CEQA, as the Project has not even attempted to "demonstrate" compliance with the Water Board's requirements or mitigation of the impacts to all federal and state protected species.

Revised Biological Resources Assessment Addendum

In May 2019, Rincon Consultants, Inc. prepared an initial Biological Resources Assessment for the Project (Rincon BRA). On December 2, 2020, Terra-Verde Environmental Consulting prepared a Revised Biological Resources Assessment Addendum for the Canna Rios Outdoor Cannabis Cultivation and Processing Project (19LUP-00000-00116), Santa Barbara, California (Revised BRA) to address comments received from the California Department of Fish and Wildlife (CDFW) on March 12, 2020 and October 23, 2020 and following a CDFW site visit on September 19, 2020.

While both the Rincon BRA and the Revised BRA note that the Cuyama River, Sisquoc River and Santa Maria River are all considered sensitive aquatic resources by the County and CDFW, they do not address the potential impact of the Project on those resources. There is no analysis of the proposed waste and compost storage area located 200 feet from the Santa Maria River, and no discussion of potential impacts to steelhead in the

3920 Southern Cross Road NE, Bainbridge, WA 98110
(206) 780 9064 (tel.); 206) 910 4772 (cel)
Kimberly.mccormick@comcast.net

Santa Maria River. Further, there is no evidence that the BRA was reviewed and revised to consider the October 2021 changes to the Project, including rotation of the compost and waste areas which moved them closer to the Santa Maria River.

Discussion

CDFW Comments on Cannabis Land Use Ordinance and Licensing Program Draft Environmental Impact Report (DEIR) SCH# 2017071016

On November 16, 2017, CDFW submitted comments to the County of Santa Barbara on the County's Cannabis Land Use Ordinance and Licensing Program Draft Environmental Impact Report (DEIR) SCH# 2017071016 ("CDFW Cannabis Program Comments"). CDFW expressed concern that the DEIR did not fully characterize potential impacts to Southern California steelhead trout and that a 200-foot setback from the watercourses would be enough to conclude that no adverse effects would occur to special-status fish in those waters.

The CDFW Cannabis Program Comments described specific impacts that could occur as, among others, wastewater discharge and runoff from cannabis activities entering and altering the existing streams and their functions which could contribute to acute or chronic pesticide poisoning or other adverse impacts to protected species. To mitigate these impacts, CDFW recommended that all permitted cannabis activities be limited to periods when there is no flow present in identified critical habitat steelhead streams.

In response, the County stated that its implementation of MM HWR-1, Cannabis Waste Discharge Requirements General Order for all cannabis projects "would ensure that impacts to surface waters from hazardous materials would be minimized by reviewing and approving compliance with the requirements of the SWRCB, and would ensure residual impacts were less than significant with mitigation." See Chapter 8. Response to Comments at 8-35.

Cannabis WDR General Order

The Porter-Cologne Water Quality Control Act, California Water Code Division 7, gives the State Water Resources Control Board (SWRCB) and Regional Water Quality Control Boards (RWQCBs) authority to implement federal Clean Water Act water quality provisions.

3920 Southern Cross Road NE, Bainbridge, WA 98110
(206) 780 9064 (tel.); 206) 910 4772 (cel)
Kimberly.mccormick@comcast.net

On February 5, 2019, SWRCB adopted Order WQ 2019-0001-DWQ, General Waste Discharge Requirements for Discharges of Waste Associated with Cannabis Cultivation Activities ("Cannabis WDR General Order"). The Cannabis WDR General Order also provided that a Regional Water Board could issue site-specific WDRs for discharges from a cannabis cultivation site to ensure water quality was protected. Cannabis General Order at 3. Because there is no analysis of the impact of the Canna Rios operations, including the proposed waste and compost storage area, on the Santa Maria River and on steelhead, the County has not determined whether the Project is in compliance with the Cannabis General Order or the County's own mitigation measure MM-HWR-1.

General WDR Compost Order

In addition to the Cannabis Waste Discharge Requirements for all cannabis projects, the Regional Water Quality Control Board, Central Coast Region, adopted Order No. WQ 2015-0121-DWQ, General WDRs for Composting Operations (General Compost Order) in August 2015 and revised it with Order No. 2020-0012-DWQ on April 7, 2020. The Order requires compost operators to implement measures to protect water quality including improvements to working surfaces, drainage channels and site retention basins to prevent wastewater discharges to surface water and groundwater. The General Order applies to facilities that aerobically compost materials such as green waste, manure, anaerobic digestate, biosolids, food scraps, and scrap paper products.

The SWRCB Composting General Order describes composting activities that produce compost for use on site, including agricultural sites, as conditionally exempt provided four criteria are met: (1) the facility receives, processes, and stores less than 25,000 cubic yards of material on site at any given time; (2) feedstocks consist of vegetative agricultural materials, green materials, and/or manure, all of which are generated by agricultural and/or similar activities; (3) the resulting compost product is returned to the same site, or a property owned by the owner of the composting activity and applied at an agronomic rate; and (4) no more than 5,000 cubic yards of compost product is given away or sold annually. To remain exempt, best management practices must be implemented. There is nothing in the record to determine if the Central Coast WDRs have been met for the proposed waste and compost storage area.

If the proposed onsite compost and waste storage area is not exempt from applicable WDRs, then agricultural composting operations may still be required to obtain coverage under other permits such as stormwater permits or agriculture-specific waste discharge requirements. There is no discussion of what other permits, if any, are required for the Project's proposed waste and compost storage area. If the proposed Project is exempt from these requirements under other provisions, and if specific WDRs have been issued

3920 Southern Cross Road NE, Bainbridge, WA 98110
(206) 780 9064 (tel.); 206) 910 4772 (cel)
Kimberly.mccormick@comcast.net

for the Project that include the proposed waste and storage area, that also should be explained.

Without any plans or description of the proposed waste and compost storage area, the County cannot determine whether or to what extent the WDRs for composting operations apply to the compost storage area, or whether the Project has met the SWRCB requirements as required by MM-HWR-1.

County Code Requirements

Santa Barbara County Code Chapter 15B (Development along Watercourses) and Chapter 17 (Solid Waste Services) are applicable to composting and solid waste. Section 15B requires a 200' setback from the Santa Maria, Sisquoc and Cuyama Rivers and places the burden on the project applicant to demonstrate compliance with the chapter's provisions. It also gives the County the ability to require a further distance if necessary. Chapter 17 includes requirements for disposal of commercial solid waste and composting. To demonstrate that these code provisions have been satisfied, the County would need an explanation from the Project applicant describing how the Project complies with these County code requirements with respect to the proposed solid waste and composting area.

Federal Requirements

The federal Clean Water Act (CWA) prohibits the discharge of any pollutant by any person and defines "discharge of a pollutant" as "any addition of any pollutant to navigable waters from any point source." 33 USC 1362(12). A "point source" is any discernible, confined and discrete conveyance . . . from which pollutants are or may be discharged." 1362(14). If a party does not obtain a National Pollutant Discharge Elimination System (NPDES) permit exempting them from this prohibition, then the party violates the CWA when it discharges a pollutant to navigable waters from a point source. A 2018 Ninth Circuit Court of Appeals case, *Hawai'i Wildlife Fund v. County of Maui*, 886 F.3d 737 (2018), found that the County of Maui was liable under the CWA for failing to obtain an NPDES permit for wells discharging pollutants into a navigable waterway.

Here, the composting and waste storage areas are discernible and confined areas that can be identified as the source of any pollution that runs into the adjacent navigable waters and therefore are point sources. The discharge of the pollutant can be by gravitational or nongravitational means and does not have to be discharged directly from the point source into the navigable water as long as it can be fairly traceable from the

3920 Southern Cross Road NE, Bainbridge, WA 98110
(206) 780 9064 (tel.); 206) 910 4772 (cel)
Kimberly.mccormick@comcast.net

point source to the navigable water. The important fact question is whether the waste and compost storage areas will "discharge" pollutants into a navigable waterway, therefore requiring an NPDES permit. Without any information regarding management of the waste and compost and the functioning of the storage areas, it is not possible to determine how they will operate and whether discharges will occur. At the very least, the County needs information regarding the waste and compost storage areas to determine whether an NPDES permit is required.

Conclusion

Because steelhead are a federally protected species under the ESA, the County must first analyze potential Project impacts to steelhead before it can satisfy CEQA requirements and guidelines, and "demonstrate compliance" with its own land use regulations with respect to this Project, including the State Water Resources Control Board's comprehensive Cannabis Cultivation Policy *prior to approval of the Land Use Permit*.

3920 Southern Cross Road NE, Bainbridge, WA 98110
(206) 780 9064 (tel.); 206) 910 4772 (cel)
Kimberly.mccormick@comcast.net

EXHIBIT 4

M. F. Strange & Associates, Inc.
AIR QUALITY AND ENVIRONMENTAL STUDIES

Memorandum

Date: December 3, 2021

To: Ms. Courtney Taylor

From: Ms. Marianne Strange

Subject: Review of Canna Rios LLC Proposed Compost and Trucking Operations

Dear Ms. Taylor:

The Canna Rios LLC cannabis cultivation project (Project) has been reviewed by M.F. Strange and Associates (MFSA). This review included an assessment of the quantity of cannabis flower (bud/cola) and cannabis green-waste that will be generated by the Project. MFSA also reviewed the Project's Transportation Demand Management Plan (TDMP) and estimated the vehicle traffic associated with the transportation of the harvested product, labor trips, cannabis green-waste, and potential composted materials. Finally, MFSA calculated the potential pollutant emissions (Volatile Organic Compounds and Ammonia) from the on-site composting program.

Using available scientific data of cannabis cultivation, and information obtained regarding the Project's Land Use Permit application, it has been estimated that the Project will yield as much as 184,800 pounds (337 cubic yards) of green-waste per year. The removal of this material from the Project site (assuming that this material will not be used for the Project in all operating years) would require 9 large (40 cubic yard) waste roll-off bins per year. This green-waste transportation estimate assumes that no additional materials are added to the cannabis green-waste to assist with the composting (e.g. food wastes or manures). Additionally, the composting of this green-waste on site will generate 3.54 tons per year of volatile organic compound (VOC) emissions along with 0.04 tons per year of ammonia (NH_3) emissions. Composting is considered a support facility to the Projects agricultural operations and is subject to Santa Barbara County Air Pollution Control District (SBCACPCD) permitting requirements. Composting does not qualify as part of the agriculture exemption allowed in SBCACPD Rules 102 *Definitions* or 202.D.3 *Exemptions to Rule 102*; based on the estimated emissions exceeding 1 ton of VOCs, the composting operation is required to obtain an Authority to Construct and a permit to Operate per SBCACPD Rule 202.D.7.

Based upon estimated size of the typical harvest boxes in Figures 1 and 2 Cannabis Harvest Boxes, and if no trimming of the colas will occur at the Project site, it was estimated that 1,200 one-way vehicle trips per year will be required to transport the two harvests per year.

I. Cannabis Green-Waste

A study conducted by the Rand Drug Policy Research Center in 2020[1] *(Estimated Cost of Production for Legalized Cannabis)* estimates that there are yields of 2,000 to 3,000 pounds of dry cannabis material per acre. Included in the total anticipated cannabis material production is an estimated 575 pounds per acre of cannabis bud/cola. The remaining 1,425 to 2,425 pounds of material are the cannabis stalks, leaves and other lower quality material. This data, along with the average density of dry cannabis (10% moisture content), was used to estimate the total green-waste and harvested cola weights for the Project. This estimate is summarized in Table 1: Cannabis Green Waste from Project.

Table 1: Cannabis Green-Waste from Project

Acres of Cannabis	48
Harvests per Year	2
Gross Yield, lb dry Cannabis/acre[1]	2500
Bud Yield, lb/Acre[1]	575
Net Green-Waste, lb/Acre	1925
Total Green-Waste per Harvest, lb	92400
Total Green-Waste per Year, lb	184800
Cannabis Green-Waste Density, pounds per cubic yard[2]	547.8
Volume of Green-Waste, Cubic yard	337.3
Volume Capacity of waste roll-off, cy yd[3]	40
Waste Haul trips per year, round trips	8.43

II. Vehicle trips

The estimation of the number of truck trips that will be required to transport the harvested colas from the Project site to the processing facility in King City was based upon pictures of typical harvest boxes that are used for other cannabis growing operations[4], and the average growing density of cannabis in outdoor cultivation.

Figures 1 & 2 Cannabis Harvest Boxes below display the boxes that will be used during the transportation of the harvested colas from the project site to the processing facility in King City.

[1] *Estimated Cost of Production for Legalized Cannabis,* Caulkins, Rand Drug Policy Research Center, July 2020

[2] *Mechanical Properties Of Hemp (Cannabis Sativa) Biomass*, Kronbergs et. al., Proceedings of the 8th International Scientific and Practical Conference Volume 1, 2011

[3] MarBorg Industries, Santa Barbara, Web Page identification of largest roll-off container, 40 cu-yd (20'Lx8'Wx6'H)

[4] https://www.pressdemocrat.com/article/news/annual-cannabis-harvest-underway-in-northern-california-as-pot-economy-tran/?artslide=5

Figures 1 & 2: Cannabis Harvest Boxes

Based upon Figures 1 and 2, it is estimated that these harvest boxes are 3 foot wide by 2 foot deep and 5 inches tall. Because the cannabis colas will be transported in a wet state (i.e. no on-site drying will be implemented), the colas must be packed to allow for air movement to avoid mold formations. Therefore, we have conservatively estimated that one harvest box will be used to hold the colas per plant. Based upon an estimate of 2,000 plants per acre[5], it was determined that 300 round trips (into and out of the Project site) per harvest will be required. This is 600 one-way trips per harvest and 1,200 one-way trips per year.

This harvest truck trip estimate is summarized in Table 2: Cannabis Vehicle Trips

Table 2: Cannabis Vehicle Trips

Harvest Boxes per stack in back of transport vehicle	6' high stack x 12 in/ft ÷ 5" per box (rounded up) =	15
Harvest Boxes Per Truck	(8' ÷ 2') across width x (16' ÷ 3') across length x (15 boxes high) =	320
Boxes per Harvest	2000 plants per acre x 48 acres x 1 plant per box	96000
Trucks trips per harvest (Two-way trips)	boxes per harvest ÷ boxes per truck	300
Trucks trips per harvest (One-way trips)	Two-way trips x 2	600
Truck trips per year (One-way trips)	Truck trips per harvest x 2	1200

[5] *First known survey of cannabis production practices in California*, Houston Wilson et. al., California Agriculture • Volume 73, Number 3–4, July–December 2019

Assumptions Used for Table 2 Calculations:

1. The colas from one cannabis plant per harvest box
2. Harvest box size ~ 2' x 3'
3. Transport vehicle has a volume capacity of 8' wide x 16' long x 6' high (8' clear inside height, ~ 6' stack height to allow for forklift maneuvering)
4. Harvest Boxes are ~ 5" tall (individually as stacked)
5. 2000 cannabis plants per acre[4]
6. 48 cannabis growing acres
7. Two harvests per year

When the 600 one-way harvest truck trips during a single harvest are combined with the 50 daily one-way employee trips during harvest[6], the CEQA Significance project screening threshold of 110 average daily trips could be exceeded if the harvest were to be accelerated to less than 6 days. It needs to be noted that if a crop is ready, harvest must be accelerated to not lose the crop.

III. Composting Emissions

Pollutant emissions from the composting activities at the Project site were estimated using the following formula[7]:

Total Annual Emissions = (CPEF x (1-CE) x TP) + (SEF x SD X TP); Equation 1

Where,

CPEF = Composting Process Emission Factor (lbs/wet-ton)
SEF = Stockpile Emission Factor (lbs/wet ton-day)
SD = Average number of days material is stockpiled (days)
CE = Control Efficiency (Percentage)
TP = Total annual facility throughput (wet-tons)

The California Air Resources Board's (ARB) recommended Emission Factors for Green-waste and Food-waste are shown in Table 3:

Table 3: Recommended Emission Factors for Green-waste and Food-waste

Pollutant	Stockpile (lbs/wet ton-day)	Composting Process (lbs/wet ton)
VOC	0.2	3.58
NH3	N/A	0.78

When the emission factors in Table 3 are applied to the formula shown in Equation 1, the pollutant emission rates shown in Table 4: Canna-Rio Composting Emissions.

[6] Per Canna Rios LLC Transportation Demand Management Plan
[7] ARB Emissions Inventory Methodology for Composting Facilities, 3/2/2015

Table 4: Canna-Rio Composting Emissions

VOC, lbs per year=	7076.0
VOC, tons per year =	3.54
VOC, lbs per day =	26.4
NH3, lbs per year =	72.1
NH3, tons per year=	0.04
NH3, lbs per day =	1.7

Assumptions Used for Canna-Rio Composting Emissions Calculations:

1. Wet tons of compost = Green-Waste Estimate per harvest yield and acreage calculation,
2. Compost stockpiles are always present, i.e., SD = 365, and
3. CE = 0; passive aeration, static pile, & no biofilter
4. 21 days per harvest, 42 total harvest days per year
5. Composting cycle of 18 days (i.e. Berkeley Method)[8]

If this were a permitted stationary source under the requirements of the Santa Barbara County Air Pollution Control District, the worst-case daily VOC emissions from the composting operations exceeds both BACT and Offset requirement thresholds found the Santa Barbara County Air Pollution Control District's New Source Review Rule 802.

IV. Summary

The Project Site Transportation Demand Management Plan (TDMP) underestimates the vehicle traffic associated with the harvest activities. The Project's estimation of 42 - 60 days per year for harvesting is referenced in the TDMP. However, if a single harvest were completed within a 6-day period, the vehicle trips would exceed the Santa Barbara County Planning's screening threshold for CEQA significance. Each harvest duration has been referenced to be as short as 21 days. However, as with any agricultural operation, when the crop is ready it must be harvested expediently. Variations in weather and seasonal conditions could conceivably require a much shorter harvest duration.

Although growing of crops is exempt from the SBCACPD permitting requirements (per District Rule 202.D.3), the quantification of emissions illustrate that there will be significant quantifiable VOC emissions from the composting. Composting does require SBCACPD review and a permit. In addition, the TMDP should be revised for accuracy and reviewed for CEQA significance. Considering Santa Barbara County's non-attainment status, and the CEQA requirement to review transient emissions, the worst-case operating scenario for trucking and composting emissions associated with this Project must be reviewed for potential emission and health impacts.

[8] https://deepgreenpermaculture.com/diy-instructions/hot-compost-composting-in-18-days/

EXHIBIT 5

ROGERS, SHEFFIELD & CAMPBELL, LLP

November 24, 2021

Via Email

Santa Barbara County Board of Supervisors
123 E. Anapamu Street
Santa Barbara, California 93101

Re: ***Appeal of Planning Commission Approval***
Canna Rios LLC - Outdoor Cannabis Cultivation (19LUP-00000-00116)

Dear Chair Nelson and Honorable Supervisors,

My name is John H. Haan, Jr. and I am a partner at Rogers, Sheffield & Campbell, LLP. Our law firm, along with the Law Office of Courtney E. Taylor, represents the interests of West Bay Company, LLC, RTV Winery, LLC, and Bien Nacido Vineyards, L.P. regarding their appeal of the Planning Commission's approval of 19LUP-00000-00116, a Land Use Permit for an outdoor cannabis cultivation operation located at 4651 Santa Maria Mesa Road in Santa Maria (APN 129-040-010) (the "Project"). While the Board of Supervisors' hearing on my clients' appeal is not until December 14, 2021, there is a specific issue related to the Project that I want to bring to the attention of the Board of Supervisors and County Counsel, which we do not feel was adequately addressed at the Planning Commission hearing. Specifically, the issue relates to the definition of "trimming" in the California Code of Regulations and Santa Barbara County Land Use and Development Code ("LUDC"). At the Planning Commission appeal hearing for the Project on May 5, 2021, the Applicant was asked what constitutes trimming, and the Applicant provided the following explanation of how it will harvest the proposed cannabis plants:[1]

> We do the same thing with cannabis. We go uh to 20 days before, and we start taking some of the leaves off, it causes air to go in and to the plant, it gives the plant a little healthier structure, and then we go in 10 days before, we do it again, and then toward the end we take the colas that we don't think that are any good, and we'll try and move them to the side in the plant, so when we are harvesting, we are just harvesting colas and we're done.

At the hearing, Applicant's counsel went on to state that the legal definition of "trimming", as it relates to "processing", only applies to dried cannabis (according to the State regulations). However, there is nothing in the California Code of Regulations that supports this contention. California Code of Regulations §15000 (eee) defines "processing" as "all activities associated with the drying, curing, grading, trimming, rolling, storing, packaging, and labeling of cannabis or nonmanufactured cannabis products." There is no distinction made between wet and dry trimming, or trimming before or after crops are removed from the soil. The literal definition of "trimming" is "to remove by or as if by

[1] See Planning Commission Hearing Video from May 5, 2021 at 5:18:52 (http://sbcounty.granicus.com/player/clip/4120?view_id=3&redirect=true).

cutting."[2] Because this language unambiguously applies to any activity associated with "trimming", there is no need to hunt for a different explanation in the legislative intent.[3] Thus, the act of removing leaves (and any other material from the plant) before or during harvest clearly falls within the definition of "trimming".

Moreover, the actions that Applicant will take in "harvesting" its cannabis fit within the cannabis industry's definition of "trimming". GAIACA, a company specializing in cannabis waste solutions, provides the following definition of "trim" on its website (**emphasis added**):[4]

> **When we talk about the trim, we're referring to the leaves that are intentionally pruned from the plant during a harvest**. It shouldn't be confused with shake, which includes the loose leaves and stems that fall off naturally.
>
> Shake is high in THC and other cannabinoids, while trim tends to have much lower cannabinoid content. For this reason, many growers simply discard their trim assuming that it has no value. However, when you realize all the things that can be done with those discarded leaves, you may think twice about tossing them aside.

The GAIACA website goes on to identify what can be done with "trim" as follows (**emphasis added**):[5]

- Make concentrates and extracts
- Enhance your meals and beverages
- Make cannabutter and other edibles
- Create homemade salves
- **Compost it**

The GAIACA website then gives a brief discussion of disposing cannabis trim responsibly (**emphasis added**):[6]

> Although you may want to explore some creative ways to use your marijuana trimmings, it's unlikely you'll be able to use all of it, especially if you're growing commercially. And maybe you're not interested in making edibles or extracts.
>
> **At any rate, you need to be mindful of how you discard your trimmings. Because they're part of the cannabis plant and have the potential to be psychoactive, you need to treat them as you would treat any other cannabis waste.**
>
> The laws for handling cannabis waste vary from one jurisdiction to the next, so you'll need to refer to any regulatory authorities and licensing agencies where you live.

---

[2] "trim." Merriam-Webster.com. 2021. https://www.merriam-webster.com (23 November 2021).

[3] "If there is no ambiguity in the language of the statute, then the Legislature is presumed to have meant what it said, and the plain meaning of the language governs." (*People v. Castenada* (2000) 23 Cal.4th 743, 747.)

[4] https://www.gaiaca.com/what-to-do-with-cannabis-trim/ at "What Is Cannabis Trim?"

[5] *Id*. at "What Can you Do With Cannabis Trim?"

[6] *Id*. at "Dispose of Your Cannabis Trim Responsibly".

In California, for example, cultivators are exempt from the law that requires most cannabis businesses to render their waste unusable and unrecognizable, but there are still a number of specific regulations that must be followed.

For instance, any business that generates two or more cubic yards of waste per week must recycle all organic waste. The waste may be composted on-site, self-hauled to an organic waste recycling facility, or hauled away by a waste disposal provider that recycles organic waste.

If you're a small-scale home grower, your best bet is probably to compost your trimmings or haul them yourself to an approved facility. If you run a commercial operation, you should always work with a licensed cannabis waste management services provider. The laws regarding cannabis waste are myriad and complex, and failure to comply can jeopardize your licensure or subject you to massive fines. Always go with the professionals.

Additionally, it appears the Project will create substantial waste as it will require a composting area covering .76 acres (113,705 sq ft). Given the size of the composting area, it is unfathomable that no "trimming/processing" will be occurring on-site as the need for a composting area of this size is a result of trimming/processing that will be occurring as part of the Project. If there was no on-site trimming/processing occurring, there would be no need for an on-site composting area, as the entire cannabis plant would be removed and taken off-site for processing (thereby creating waste at the processing facility and not at the Project site).

To provide context with respect to the trimmed plant material and composting area, it is conceivable that as much as 184,800 pounds of cannabis plant waste material (337 cubic yards) will be generated annually from this cultivation operation. Literature indicates that cannabis cultivation can produce a gross yield of 2,500 pounds of dry cannabis per acre, with 575 pounds of that gross yield being the cannabis flower (*i.e.*, cola)[7]. This leads to a net cannabis plant waste yield of 1,975 pounds per acre. Dry cannabis plants have a typical density of 547.8 pounds per cubic yard[8]. When these fixed cannabis characteristics are combined with the Project's operating parameters (*i.e.*, 48 cultivated acres and 2 crops per year) a total cannabis plant waste of 184,800 pounds (337.3 cubic yards) is estimated. This volume of compost would require processing through accelerated composting techniques to avoid the stacking of subsequent years wastes. It is inconceivable that 337 cubic yards can be mixed with the necessary bio-wastes and organic wastes and have the necessary room to mix and turn the piles, all within a 0.76 acre area.

In light of the above, the Project fails to meet the requirements of LUDC Section 35.42.075.D.1.o, which requires that the drying, curing, and/or trimming of harvested cannabis shall either (1) be located within an enclosed structure which utilizes best available control technology, or (2) include techniques and/or equipment that shall achieve an equivalent or greater level of odor control as

---

[7] Estimated Cost of Production for Legalized Cannabis, Caulkins, Rand Drug Policy Research Center, July 2020 (https://www.rand.org/content/dam/rand/pubs/working_papers/2010/RAND_WR764.pdf).

[8] Mechanical Properties Of Hemp (Cannabis Sativa) Biomass, Kronbergs et. al., Proceedings of the 8th International Scientific and Practical Conference Volume 1, 2011(https://agris.fao.org/agris-search/search.do;jsessionid=694F67C6A184B3B685633DA39B2AC107?request_locale=fr&recordID=LV2011000674&query=&sourceQuery=&sortField=&sortOrder=&agrovocString=&advQuery=&centerString=&enableField=).

could be achieved using an enclosed structure which utilizes best available control technology. The Project's activities are neither contained within an enclosed structure, nor using equipment or technology that achieves an equivalent or greater level of odor control as could be achieved using an enclosed structure, which utilizes best available control technology (or "BACT").

There is evidence that even the Applicant is unclear whether their activities constitute "trimming" under the LUDC. The original Project Description included "trimming" of cannabis on-site in the outdoor cannabis areas. The Staff Report at the Planning Commission hearing on May 5, 2021, however, removed this reference but did not indicate or state that the removal of references to trimming on-site was a modification made by the Applicant prior to the hearing. Other changes to the Project were specifically identified, but this was not.

The Project site plans state there will be "No drying, trimming, or finish packaging onsite…" with other references to activities which state that harvested cannabis will be "boxed and shipped away same day…" These statements are incorrect, as Applicant intends to engage in processing by harvesting and trimming cannabis in the field and packing cannabis onsite. The LUDC specifically defines "processing" for cannabis as "All activities associated with drying, curing, trimming, storing, packaging, and labeling of nonmanufactured cannabis products." The activities proposed by the Applicant fall within the County's own definition of "processing" and the attendant odor control methods in LUDC Section 35.42.075.D.1.o are required upon commencement of any Project activities.

BACT for enclosed cannabis structures has been demonstrated by other cannabis growers in the County, most recently the Planning Commission deemed the "platinum standard" to be the odor control system proposed by CVW Organic Farms. That project includes both carbon filtration systems (*i.e.*, carbon or molecular filters or scrubbers) which are currently viewed as the best control technology for reducing VOC emissions from cannabis cultivation facilities, and vapor phase systems (which are reported to reduce odors by 98.7% to 100%[9], from Criterion Environmental Inc. and Byers Scientific, respectively). The LUDC clearly requires the Applicant to reduce odors from the Project to the equivalent of at least 98.7%, and to implement odor technology that achieves an equivalent or greater level of odor control as could be achieved using an enclosed structure which utilizes best available control technology. The Applicant fails to demonstrate that it has met the requirements of LUDC Section 35.42.075.D.1.o.

If you would like to further discuss this issue prior to the hearing, please let me know.

Respectfully submitted,

ROGERS, SHEFFIELD & CAMPBELL, LLP

John H. Haan, Jr.
Attorneys for Appellants

Cc: Client
Courtney E, Taylor, Law Office of Courtney E. Taylor, APC
Caroline Kim, Santa Barbara County Counsel

[9] See CVW Organic Farms odor plans available here:
https://cosantabarbara.app.box.com/s/q97rv82305oyfnbdjhcyxrrdhu3dgkqy/file/745056379250

EXHIBIT 6

Law Office of Kim McCormick, PLLC

Memorandum

Date: December 3, 2021

To: Marshall Miller, Courtney Taylor

From: Kim McCormick

Re: Federal Rivers and Harbors Act and Clean Water Act Issues Associated With Proposed Canna Rios, LLC Cannabis Cultivation Project

Facts

On May 7, 2021, the Santa Barbara County Planning Commission denied an appeal filed by Bien Nacido Vineyards, L.P. (Bien Nacido), among others, of Planning Director approval on February 8, 2021, of a Land Use Permit (LUP) for the Canna Rios, LLC Cannabis Cultivation Project (Project). The Project is located adjacent to and west of the Bien Nacido Vineyards on 245.46 acres of a 431.22-acre legal lot. A portion of that legal lot is located adjacent to and northwest of the proposed Project site and includes an area that appears to have been created by the construction of earthen berms that resulted in the rerouting of the Cuyama River.

In light of historical flooding that has occurred along the Cuyama River in this area, the construction of these berms and rerouting of the Cuyama River could result in significant damage to the Bien Nacido Vineyards. Bien Nacido contends that the Project cannot move forward as proposed until the County has confirmed that the berm construction and rerouting of the Cuyama River was done in accordance and compliance with all applicable permit requirements, including permits required under the federal Rivers and Harbors Act and Clean Water Act. Regardless of the Project's statements regarding the history or timing of the construction of the berm, each week's continuance of any such obstruction is deemed a separate offense by law notwithstanding who or when the berm was constructed. 33 USC 403a.

Discussion

Permit History

In February-March 1998, during an El Niño storm event, runoff from the Sisquoc River drainage basin caused a breakout of the levee system on the Santa Maria River

3920 Southern Cross Road NE, Bainbridge, WA 98110
(206) 780 9064 (tel.); 206) 910 4772 (cel)
Kimberly.mccormick@comcast.net

downstream of Twitchell Dam. This resulted in flood control releases from Twitchell Dam of up to 5000 cfs of water and the export of thousands of cubic yards of silt into areas to the south, including the Cuyama River. Two bridges on the Cuyama River were destroyed and, in some places, the riverbed was filled to the top of the banks with silt.

On March 20, 1998, four affected property owners – Beringer Wine Estates (managed by Hampton Farming Co.), Newhall Farming Company, Adams Ranch and Bien Nacido Vineyards – requested authorization from the U.S. Army Corps of Engineers (USACE) to restore the Cuyama River downstream from Twitchell Dam, including taking the following actions, which are listed from downstream to upstream along the Cuyama River, beginning at the property boundary between Bien Nacido and Beringer (about 1.5 miles upstream from the unpermitted berm):

1. South portion of the stream – water had deviated around the original channel on both sides, leading to serious erosion of the banks on the west side of the river and eliminating the road, gate and easement to Beringer Wine Estates and Newhall properties. The eastern side of the stream was flowing into the vineyards of Beringer Wine Estates and Bien Nacido Vineyards, with approximately 14,445 cubic yards of silt needing to be removed. Approval was sought to remove sediment blocking the original channel and deposit the excess material where banks had been broken and farmland eroded and to backfill the washout.

   Straightening the streambed would release pressure of the westerly stream flow, which had eaten away the easement road and the channel would be straightened just south of the Newhall crossing where the creek turned west.

2. Middle portion of the stream – sediment had filled the Cuyama River bed and water had broken into the farm field. Proposed action was to remove the sediment from the streambed and place it back on farm property.

3. Far north portion of the stream – here the Cuyama River channel had broken and flow had gone against the mesa/hillside that included vineyards, power lines and water wells, taking away large amounts of soil. A new channel was created in farmland to keep the water flowing straight and to prevent the mesa from losing more soil.

USACE 1998 Permits

On April 1, 1998, the U.S. Army Corps of Engineers (USACE), Los Angeles District, approved Cuyama River bank repairs and the redirection of water at three (3) specific locations in

3920 Southern Cross Road NE, Bainbridge, WA 98110
(206) 780 9064 (tel.); 206) 910 4772 (cel)
Kimberly.mccormick@comcast.net

the Cuyama River under Department of the Army Regional General Permit 52 (authorizing emergency actions for necessary flood protection measures in waters of the United States), pursuant to Section 404 of the Clean Water Act. The approved work was described as follows, which are again listed from downstream to upstream along the Cuyama River, beginning at the property boundary between Bien Nacido and Beringer (about 1.5 miles upstream from the unpermitted berm):

1. **Site 1** - a 1,584-foot long pilot channel would be cut through an existing gravel bar to redirect water away from the west bank of the river. Approximately 12,220 cubic yards of sediment would be removed from the proposed pilot channel. This work would repair a severely eroded bank and access road washout. Sediment would be placed atop adjacent farm fields or would be used to backfill the washout.

Source: Google Earth, Prepared by Appellant using USACE FOIA response

2. **Site 2** – immediately upstream, approximately 14,445 cubic yards of material would be removed from the original channel, which was blocked with sediment and resulted in meander and erosional patterns in the river. The work would occur over a 2000-foot-long reach and would connect to the Site 1 pilot channel.

3. **Site 3** – newly deposited sediment would be used to direct flows into the historic channel, and would include filling an approximately 400-foot-long reach of the river channel with approximately 2,380 cubic yards of sediment to redirect flows. Excess sediment would be placed atop adjacent farm fields.

4. **Site 4** – sediment would be excavated from existing gravel bars and placed onto a 300-400-foot-long reach of the severely eroded bank. The final bank slope would be 2:1. Water also was diverted through a pilot channel that was newly cut through existing farm fields on the west side of the valley to alleviate erosion at Site 3.

3920 Southern Cross Road NE, Bainbridge, WA 98110
(206) 780 9064 (tel.); 206) 910 4772 (cel)
Kimberly.mccormick@comcast.net

Permitted Bridge Replacements

In 2001, the North Canyon Bridge Replacement Project was approved and two replacement bridges were constructed over the Cuyama River on the Bien Nacido and Beringer parcels. This work was permitted by the USACE under Section 404 of the Clean Water Act and by the California Department of Fish and Wildlife (CDFW) under Fish and Game Code Section 1600 (Lake and Streambed Alteration Agreement). Both Santa Barbara County and San Luis Obispo County also approved the bridge replacement project.

Maps provided by USACE depicting this approved work do not show the features now existing on the Maldonado property where the Project is proposed, including the redirected river course and the berm area now being used as a river crossing and equipment and tractor storage. *See* Attachment 1, letter dated November 30, 2021, to Kimberly McCormick, Law Office of Kim McCormick, PLLC, from USACE, Los Angeles District, in response to FOIA Request FA-22-0001, and attached maps.

Federal Law Applicability

Rivers and Harbors Act, 33 USC 400 *et seq.*

The Rivers and Harbors Act, 33 USC 401 *et seq.*, (Act) prohibits the construction of any bridge, causeway, dam or dike over any navigable water of the United States unless either approved by the Coast Guard or the U.S. Army Corps of Engineers (USACE). The creation of any unauthorized obstruction to the navigable capacity of any waters of the United States is prohibited unless authorized by the USACE. 33 USC 403. All excavation or fill to modify or alter the course, location, condition or capacity of the channel of any navigable water of the United States must be authorized by USACE prior to the beginning of the work. 33 USC 403.

If an obstruction to the navigable capacity of any water of the United States is created without authorization, the continuance of that obstruction, except bridges, piers, docks and wharves and similar structures erected for business purposes, constitutes an offense and each week's continuance of any such obstruction is deemed a separate offense. 33 USC 403a. Continuing or creating an unlawful obstruction is a misdemeanor punishable by a fine not to exceed $5,000 or by imprisonment (for a natural person) not exceeding one year, or by both. 33 USC 403a. A district court also may issue an injunction ordering the obstruction to be removed. *Id*. Further, any violation of Sections 401, 403 and 404 of the Act is a misdemeanor punishable by a fine not exceeding $2500 nor less than $500 or by imprisonment (for a natural person) not exceeding one year, or both. 33 USC 406. The

3920 Southern Cross Road NE, Bainbridge, WA 98110
(206) 780 9064 (tel.); 206) 910 4772 (cel)
Kimberly.mccormick@comcast.net

District Court also may order removal of any structures or parts of structures erected in violation of Section 401, 403 and/or 404. *Id.*

The Cuyama River is a navigable water of the United States. The construction of berms and any alteration of the course of the river are actions constituting (1) a violation of the Act unless authorized by the USACE prior to the commencement of work and (2) a continuing violation of the Act if the berms and crossing are still in place. There is no evidence that this work was ever permitted by USACE. A Freedom of Information Act (FOIA) request dated June 16, 2021, requesting information regarding impoundment at and resulting diversion of the Cuyama River from 1964 to the present, resulted in a finding of no responsive documents by the USACE. *See* Attachment 2, letter dated July 27, 2021 from USACE, Los Angeles District, to Joshua Bloom, Environmental General Counsel LLP, FOIA 21-0082. Accordingly, it appears the berms and the access road were created in violation of the Act and remain in continuing violation of the Act.

Clean Water Act, 33 USC 1344 *et seq.*

The Clean Water Act (CWA) authorizes issuance by the USACE of permits for the discharge of dredge or fill material in waters of the United States. 33 USC 1344. CWA Section 1344(f)(1) includes some exemptions from permit requirements for the following activities:

1. Normal farming, silviculture and ranching activities such as plowing, seeding, cultivating, minor drainage, harvesting for the production of food, fiber, and forest products, or upland soil and water conservation practices

2. Maintenance, including emergency reconstruction of recently damaged parts of currently serviceable structures such as dikes, dams, levees, groins, riprap, breakwaters, causeways and bridge abutments or approaches, and transportation structures

3. Construction or maintenance of farm or stock ponds or irrigation ditches, or the maintenance of drainage ditches

4. Construction of temporary sedimentation basins on a construction site which does not include placement of fill material into the navigable waters

5. Construction or maintenance of farm roads or forest roads or temporary roads where such roads are constructed and maintained in accordance with best management practices to assure that flow and circulation patterns and

3920 Southern Cross Road NE, Bainbridge, WA 98110
(206) 780 9064 (tel.); 206) 910 4772 (cel)
Kimberly.mccormick@comcast.net

chemical and biological characteristics of the navigable waters are not impaired, that the reach of the navigable waters is not reduced and that any adverse effect on aquatic environment is minimized.

However, these permit exemptions do not apply if the discharge of dredged or fill material into a navigable water is incidental to any activity having as its purpose bringing an area of the navigable waters into a use to which it was not previously subject, where the flow or circulation of navigable waters may be impaired or the reach of such waters may be reduced. In that case, a permit is required under 33 USC 1344. 33 USC 1344(f)(2).

The activities conducted on the Maldonado property appear to have been for the purpose of rerouting the Cuyama River to create dry land and an access route for portions of the property not used for crop production. As discussed above, there appears to be no evidence that these activities were ever permitted by the USACE under the CWA and therefore would be in violation of the CWA absent any other authorization.

Source: Google Earth

Attachment 1 USACE response dated November 30, 2021, to FOIA Request FA-22-0001, from USACE, Los Angeles District, to Kim McCormick, Law Office of Kim McCormick, PLLC, with attachments

Attachment 2 USACE response dated July 27, 2021, to FOIA 21-0083 request, from USACE, Los Angeles District, to Joshua Bloom, Environmental General Counsel LLP

3920 Southern Cross Road NE, Bainbridge, WA 98110
(206) 780 9064 (tel.); 206) 910 4772 (cel)
Kimberly.mccormick@comcast.net

Attachment 1

FP-22-000136
FA-22-0001

Law Office of Kim McCormick, PLLC

By Email (publicaffairs.spl@usace.army.mil) and U.S. Mail

October 4, 2021

U.S. Army Corps of Engineers
Los Angeles Regulatory District
915 Wilshire Blvd., Suite 1101
Los Angeles, CA 90017

Re: Freedom of Information Act Request

Dear Sir/Madam:

In accordance with the federal Freedom of Information Act, 5 U.S.C. Section 552, please provide the following information with respect to a letter dated April 1, 1998 from the Department of the Army, Los Angeles District, Corps of Engineers, Ventura Field Office, 2151 Alessandro Drive, Suite 255, Ventura, California 93001, signed by Bruce A. Henderson on behalf of David J. Castanon, Chief, North Coast Section, to Hampton Farming Company, Attn: Mr. Dale Hampton, 2515 Professional Parkway, Santa Maria California 93455, regarding Department of the Army Regional General Permit Authorization (hereinafter "Letter").

A copy of the aforementioned Letter is attached to this request. Specifically, we are seeking the attached drawings referenced in the Letter (see Letter paragraph 3) and all other attachments and documents, including correspondence, maps, memoranda, approvals, authorizations, disapprovals and filings pertaining to and/or associated with the Letter and the matters described therein.

By this letter, we provide our agreement to pay any applicable fees associated with this FOIA request. Please contact me at kimberly.mccormick@comcast.net or 206 910 4772 if you have any questions.

Sincerely,

Kimberly M. McCormick

Kimberly M. McCormick

Attachment (1)

3920 Southern Cross Road NE, Bainbridge Island, WA 98110
(206) 780 9064 (tel.); (206) 910 4772 (cel)
Kimberly.mccormick@comcast.net

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
VENTURA FIELD OFFICE
2151 ALESSANDRO DRIVE, SUITE 255
VENTURA, CALIFORNIA 93001

April 1, 1998

REPLY TO
ATTENTION OF:

Office of the Chief
Regulatory Branch

DEPARTMENT OF THE ARMY REGIONAL GENERAL PERMIT AUTHORIZATION

Hampton Farming Company
Attn: Mr. Dale Hampton
2515 Professional Parkway
Santa Maria, California 93455

Dear Mr. Hampton:

This is in reply to your facsimile (No. 98-50301-TS) dated March 20, 1998, concerning our permit authority under Section 404 of the Clean Water Act of 1972 (33 U.S.C. 1344) over your proposal to conduct bank repairs and redirect water at three specific locations in the Cuyama River, located east of the City of Santa Maria, Santa Barbara County, California.

At Site 1, you have proposed to cut a 1,584-foot-long pilot channel through an existing gravel bar in order to redirect water away from the west bank of the river. Approximately 12,220 cubic yards of sediment would be removed from the proposed pilot channel. This work is needed in order to repair a severely eroded bank and access road washout. The sediment would be placed atop adjacent farm fields or would be used to backfill the wash-out.

At Site 2, immediately upstream of this area, approximately 14,445 cubic yards of material would be removed from the original channel which is currently blocked with sediment, and resulted in meander and erosional patterns in the river. This work would occur over a 2,000-foot-long reach and would connect to the Site 1 pilot channel (see attached drawings).

At Site 3, newly deposited sediment would be used to redirect flows into the historic channel. This work would include filling an approximately 400-foot-long reach of the river channel with approximately 2,380 cubic yards of sediment for the purpose of redirecting flows. Excess sediment would also be placed atop adjacent farm fields.

Lastly, repairs at Site 4 would include excavation of sediment from existing gravel bars and placement of this material onto a 300 to 400 foot-long reach of the severely eroded bank. The final bankslope (now vertical) would be approximately 2:1. Water has also been diverted through a pilot channel that was newly cut through existing farm fields on the west side of the valley, in order to alleviate erosion at Site 3.

The Corps of Engineers has determined that your proposed activity complies with the terms and conditions of regional general permit number 52 (RGP 52), dated January 21, 1998,

which authorizes emergency actions for public agencies and private parties for necessary flood protection measures in waters of the United States, including wetlands, where there is an imminent threat to life or property (such as those situations that could potentially result in an unacceptable hazard to life, a significant loss of property, or an immediate, unforeseen, and significant economic hardship if corrective action requiring a permit is not undertaken immediately).

As long as you comply with the attached regional general permit terms and conditions, an individual permit is not required. This letter of verification is valid until July 31, 1998.

Furthermore, you must comply with the following Special Conditions:

1. The permittee shall implement all special conditions provided by the National Marine Fisheries Service (NMFS, attached).

2. The permittee shall restrict borrow areas from the river bottom to unvegetated or sparsely vegetated gravel bars or adjacent upland sites to the maximum extent practicable. Changes to the riverbed contours and elevations shall be minimized.

3. In order to minimize turbidity, at Sites 1 and 2, work on the proposed pilot channel shall take place from the downstream end, working toward the upstream end. The connection to flowing water shall be made last. In addition, at Site 4, work on the bank shall take place from the upstream end of the washout and proceed downstream.

4. Access to the riverbottom at each work site shall be restricted to a single point access. All temporary access ramps shall be removed from the river bank immediately upon project completion. Access ramp materials shall be deposited on adjacent uplands, outside the active channel or spread evenly on dry, unvegetated riverbottom.

5. If necessary, the permittee shall make all efforts to collect and preserve any injured or dead steelhead trout or California red-legged frogs that come into harms way during construction activities. The Corps, NMFS and USFWS shall be notified immediately of such "take". Preservation shall be in the form of freezing (in a Ziploc bag, without water). The collector, time, date, and method of injury to said specimens shall be documented in writing. This documentation and said specimens shall be provided to the appropriate Service as soon as practicable.

6. The permittee shall preserve native riparian vegetation and willow trees at each site to the maximum extent practicable. Any native riparian vegetation removed during construction shall be salvaged and utilized along the newly repaired banks in order to further stabilize loose soil.

7. All equipment operators shall be instructed to recognize native riparian vegetation to be avoided.

8. The permittee shall document all aspects of construction at each site. Aerial or ground based photos or color copies of each site, taken before, during (mid-way) and after project completion, shall be submitted to the Corps as a component of reporting requirements associated with RGP 52 (Condition 4, page 8, attached).

9. The permittee shall revegetate the newly repaired bank slopes. A revegetation plan and schedule shall be submitted to the Corps as a component of the reporting requirements associated with RGP 52.

10. The permittee shall review these permit conditions with all personnel associated with the construction project. All personnel shall document that he/she understands the conditions contained herein. The permittee shall submit said documentation to the Corps (via facsimile).

11. The permittee shall minimize the duration and frequency of crossing flowing water with heavy equipment.

A regional general permit does not grant any property rights or exclusive privileges. Also, it does not authorize any injury to the property or rights of others or authorize interference with any existing or proposed Federal project. Furthermore, it does not obviate the need to obtain other Federal, state, or local authorizations required by law.

Thank you for participating in our regulatory program. If you have any questions, please contact Dr. Theresa Stevens of my staff at (805) 641-0936.

Sincerely,

Bruce A. Henderson

for David J. Castanon
Chief, North Coast Section

Enclosures

cf: Mr. Jim Menagh - via facsimile (805) 925-3526
Mr. Stephen Miller - via facsimile (805) 565-1327

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOS ANGELES DISTRICT
915 WILSHIRE BOULEVARD, SUITE 930
LOS ANGELES, CALIFORNIA 90017-3489

REPLY TO
ATTENTION OF

November 30, 2021

Office of
District Counsel

Kimberly M. McCormick
Law Office of Kim McCormick, PLLC
3920 Southern Cross Road, NE
Bainbridge Island, WA 98110

RE: FOIA 22-0001 **Letter dated April 1, 1998 from the Department of the Army, Los Angeles District, Corps of Engineers to Hampton Farming Company, regarding Department of Army General Permit Authorization**

Dear Ms. McCormick,

This letter concerns your Freedom of Information Act (FOIA) request dated October 4, 2021. Your request has been assigned number FA-22-0001, copy enclosed. Please use this reference number in any further correspondence.

In your letter, you requested documents related to the above-referenced subject. Generally, it is the policy of the Department of the Army to release the maximum amount of information under the FOIA unless that information is exempt from release and an important reason exists for nondisclosure.

Under Exemption 6 of the FOIA, an agency may withhold information or records to protect individuals with a privacy interest. Specifically, Exemption 6 exempts from release "files, the disclosure of which would constitute a clearly unwarranted invasion of personal privacy." The Supreme Court has interpreted Exemption 6 files' broadly to include any information which applies to a particular individual. *Rojas v. Fed. Aviation Admin.*, 941 F.3d 392, 405 (9th Cir. 2019) (citing *U.S. Dep't of State v. Washington Post Co.*, 456 U.S. 595, 602 (1982)). In this instance, I have determined that the privacy interests in certain portions of records responsive to your request outweigh the public interest in that information. Such redacted information includes personal or contact information of certain outside parties. I have determined that these parties' interest in maintaining personal information that is not public outweighs the public interest in disclosure of this information

Additionally, subsequent to the 9/11 terrorist attacks, the Office of the Secretary of Defense (OSD) determined that all Department of Defense (DoD) employees, including civilians such as those that work for the Corps of Engineers, are at increased security risk. As a result, OSD has authorized a more scrutiny of personally identifying information (including lists of e-mail addresses) prior to release of that information under FOIA. *See also Center for Public Integrity v. U.S. Office of Personnel Management*, 2006 U.S. Dist. LEXIS 87367 at 18 (D.D.C. 2006), where the U.S. District Court for the

District of Columbia found that DoD employees have a privacy interest in their names and duty stations, and that their privacy interest "outweighs the minimal FOIA-related public interest in disclosure."

Multiple pages of the requested documents contain Corps of Engineers employees' names, addresses, work telephone numbers and/or email addresses. It is our position that those individuals have a privacy interest in that type of identifying information. Accordingly, that information has been redacted in accordance with Exemption 6 and OSD policy.

I trust that you will appreciate the consideration upon which this determination is based. However, you are advised of your right to appeal this determination through this office to the Secretary of the Army (ATTN: General Counsel). An appeal must be received within 90 days of the date of this letter. The envelope containing the appeal should bear the notation "Freedom of Information Act Appeal" and be sent to: U.S. Army Corps of Engineers, Los Angeles District, ATTN: Office of the District Counsel (CESPL-OC), 915 Wilshire Boulevard, Suite 930, Los Angeles, CA 90017. Upon receipt, this office will forward any appeal to the Office of the Chief of Engineers in Washington, D.C., for independent review.

For any further assistance or to discuss any aspect of your request, you have the right to contact the U.S. Army Corps of Engineers FOIA Public Liaison. Additionally, you have the right to contact the Office of Government Information Services (OGIS) to inquire about FOIA mediation services they offer.

Contact Information:

U.S. Army Corps of Engineers
FOIA Public Liaison
441 G. Street, NW
ATTN: CECC-G
Washington, DC 20314-1000
Email: foia-liaison@usace.army.mil
Phone: 202-761-0511

Office of Government Information Services
National Archives and Records Administration
8601 Adelphi Road-OGIS
College Park, MD 20740-6001
E-Mail: ogis@nara.gov
Phone: 202-741-5770 or
Toll Free: 877-684-6448

We apologize for the delayed release of the documents and thank you for your continued patience throughout this process. If you have further questions, please contact Ms. Hannah Gae by email at hannah.gae@usace.army.mil.

Sincerely,

Hannah Gae

For Shirley R. Edwards
District Counsel

Enclosure

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
VENTURA FIELD OFFICE
2151 ALESSANDRO DRIVE, SUITE 255
VENTURA, CALIFORNIA 93001

REPLY TO
ATTENTION OF:

April 1, 1998

Office of the Chief
Regulatory Branch

DEPARTMENT OF THE ARMY REGIONAL GENERAL PERMIT AUTHORIZATION

Hampton Farming Company
Attn: Mr. Dale Hampton
(b) (6)
[redacted]

Dear Mr. Hampton:

This is in reply to your facsimile (No. 98-50301-TS) dated March 20, 1998, concerning our permit authority under Section 404 of the Clean Water Act of 1972 (33 U.S.C. 1344) over your proposal to conduct bank repairs and redirect water at three specific locations in the Cuyama River, located east of the City of Santa Maria, Santa Barbara County, California.

At Site 1, you have proposed to cut a 1,584-foot-long pilot channel through an existing gravel bar in order to redirect water away from the west bank of the river. Approximately 12,220 cubic yards of sediment would be removed from the proposed pilot channel. This work is needed in order to repair a severely eroded bank and access road washout. The sediment would be placed atop adjacent farm fields or would be used to backfill the wash-out.

site 1
~0.95ac

At Site 2, immediately upstream of this area, approximately 14,445 cubic yards of material would be removed from the original channel which is currently blocked with sediment, and resulted in meander and erosional patterns in the river. This work would occur over a 2,000-foot-long reach and would connect to the Site 1 pilot channel (see attached drawings).

Site 2
~1.19ac

At Site 3, newly deposited sediment would be used to redirect flows into the historic channel. This work would include filling an approximately 400-foot-long reach of the river channel with approximately 2,380 cubic yards of sediment for the purpose of redirecting flows. Excess sediment would also be placed atop adjacent farm fields.

Site 3
0.23
ac

Lastly, repairs at Site 4 would include excavation of sediment from existing gravel bars and placement of this material onto a 300 to 400 foot-long reach of the severely eroded bank. The final bankslope (now vertical) would be approximately 2:1. Water has also been diverted through a pilot channel that was newly cut through existing farm fields on the west side of the valley, in order to alleviate erosion at Site 3.

~1
ac

~3.37
ac
total

The Corps of Engineers has determined that your proposed activity complies with the terms and conditions of regional general permit number 52 (RGP 52), dated January 21, 1998,

which authorizes emergency actions for public agencies and private parties for necessary flood protection measures in waters of the United States, including wetlands, where there is an imminent threat to life or property (such as those situations that could potentially result in an unacceptable hazard to life, a significant loss of property, or an immediate, unforeseen, and significant economic hardship if corrective action requiring a permit is not undertaken immediately).

As long as you comply with the attached regional general permit terms and conditions, an individual permit is not required. This letter of verification is valid until July 31, 1998.

Furthermore, you must comply with the following Special Conditions:

1. The permittee shall implement all special conditions provided by the National Marine Fisheries Service (NMFS, attached).

2. The permittee shall restrict borrow areas from the river bottom to unvegetated or sparsely vegetated gravel bars or adjacent upland sites to the maximum extent practicable. Changes to the riverbed contours and elevations shall be minimized.

3. In order to minimize turbidity, at Sites 1 and 2, work on the proposed pilot channel shall take place from the downstream end, working toward the upstream end. The connection to flowing water shall be made last. In addition, at Site 4, work on the bank shall take place from the upstream end of the washout and proceed downstream.

4. Access to the riverbottom at each work site shall be restricted to a single point access. All temporary access ramps shall be removed from the river bank immediately upon project completion. Access ramp materials shall be deposited on adjacent uplands, outside the active channel or spread evenly on dry, unvegetated riverbottom.

5. If necessary, the permittee shall make all efforts to collect and preserve any injured or dead steelhead trout or California red-legged frogs that come into harms way during construction activities. The Corps, NMFS and USFWS shall be notified immediately of such "take". Preservation shall be in the form of freezing (in a Ziploc bag, without water). The collector, time, date, and method of injury to said specimens shall be documented in writing. This documentation and said specimens shall be provided to the appropriate Service as soon as practicable.

6. The permittee shall preserve native riparian vegetation and willow trees at each site to the maximum extent practicable. Any native riparian vegetation removed during construction shall be salvaged and utilized along the newly repaired banks in order to further stabilize loose soil.

7. All equipment operators shall be instructed to recognize native riparian vegetation to be avoided.

8. The permittee shall document all aspects of construction at each site. Aerial or ground based photos or color copies of each site, taken before, during (mid-way) and after project completion, shall be submitted to the Corps as a component of reporting requirements associated with RGP 52 (Condition 4, page 8, attached).

9. The permittee shall revegetate the newly repaired bank slopes. A revegetation plan and schedule shall be submitted to the Corps as a component of the reporting requirements associated with RGP 52.

10. The permittee shall review these permit conditions with all personnel associated with the construction project. All personnel shall document that he/she understands the conditions contained herein. The permittee shall submit said documentation to the Corps (via facsimile).

11. The permittee shall minimize the duration and frequency of crossing flowing water with heavy equipment.

A regional general permit does not grant any property rights or exclusive privileges. Also, it does not authorize any injury to the property or rights of others or authorize interference with any existing or proposed Federal project. Furthermore, it does not obviate the need to obtain other Federal, state, or local authorizations required by law.

Thank you for participating in our regulatory program. If you have any questions, please contact Dr. Theresa Stevens of my staff at (805) 641-0936.

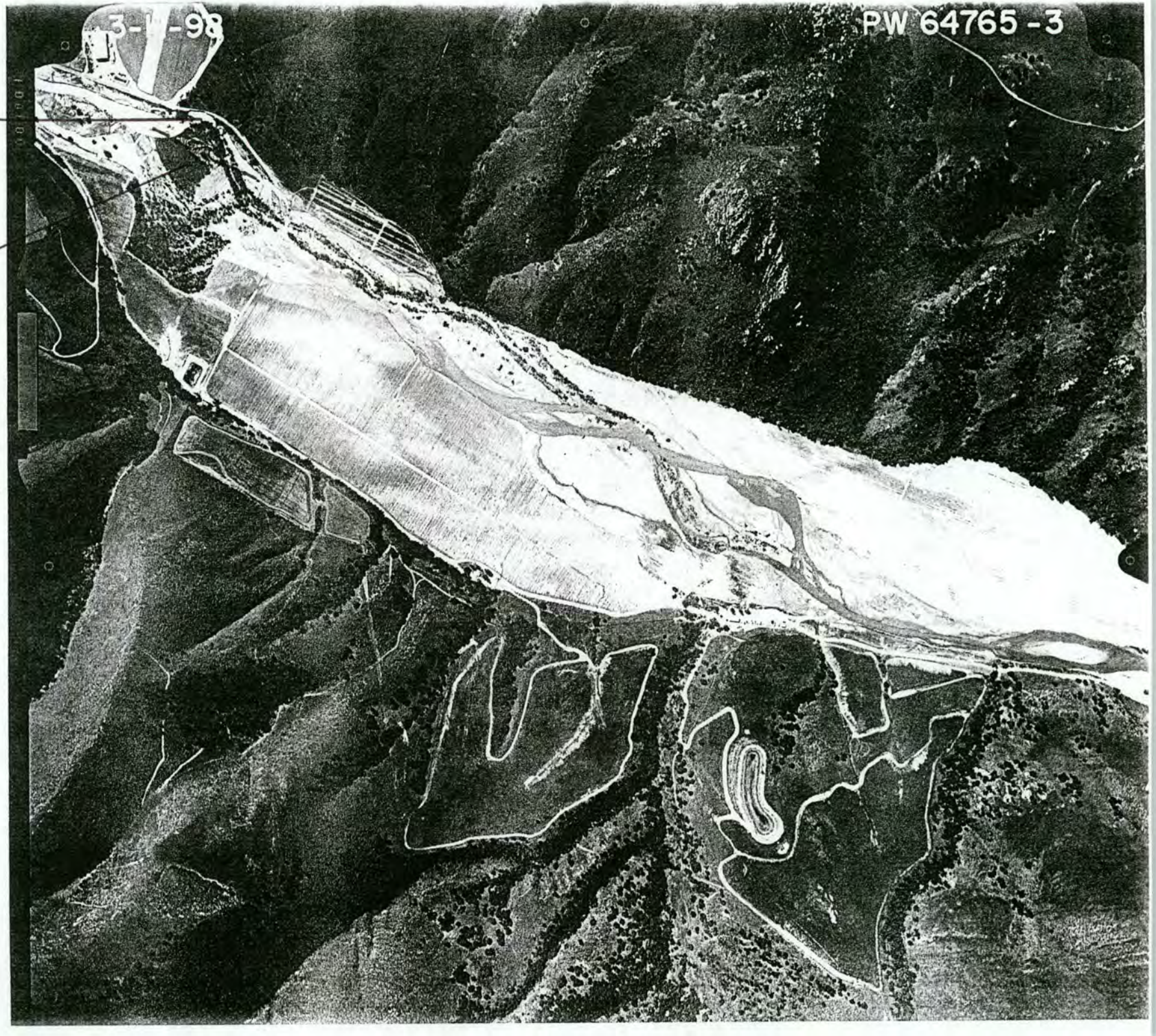
Sincerely,

David J. Castanon
Chief, North Coast Section

Enclosures

cf: Mr. Jim Menagh - via facsimile (805) 925-3526
Mr. Stephen Miller - via facsimile (805) 565-1327

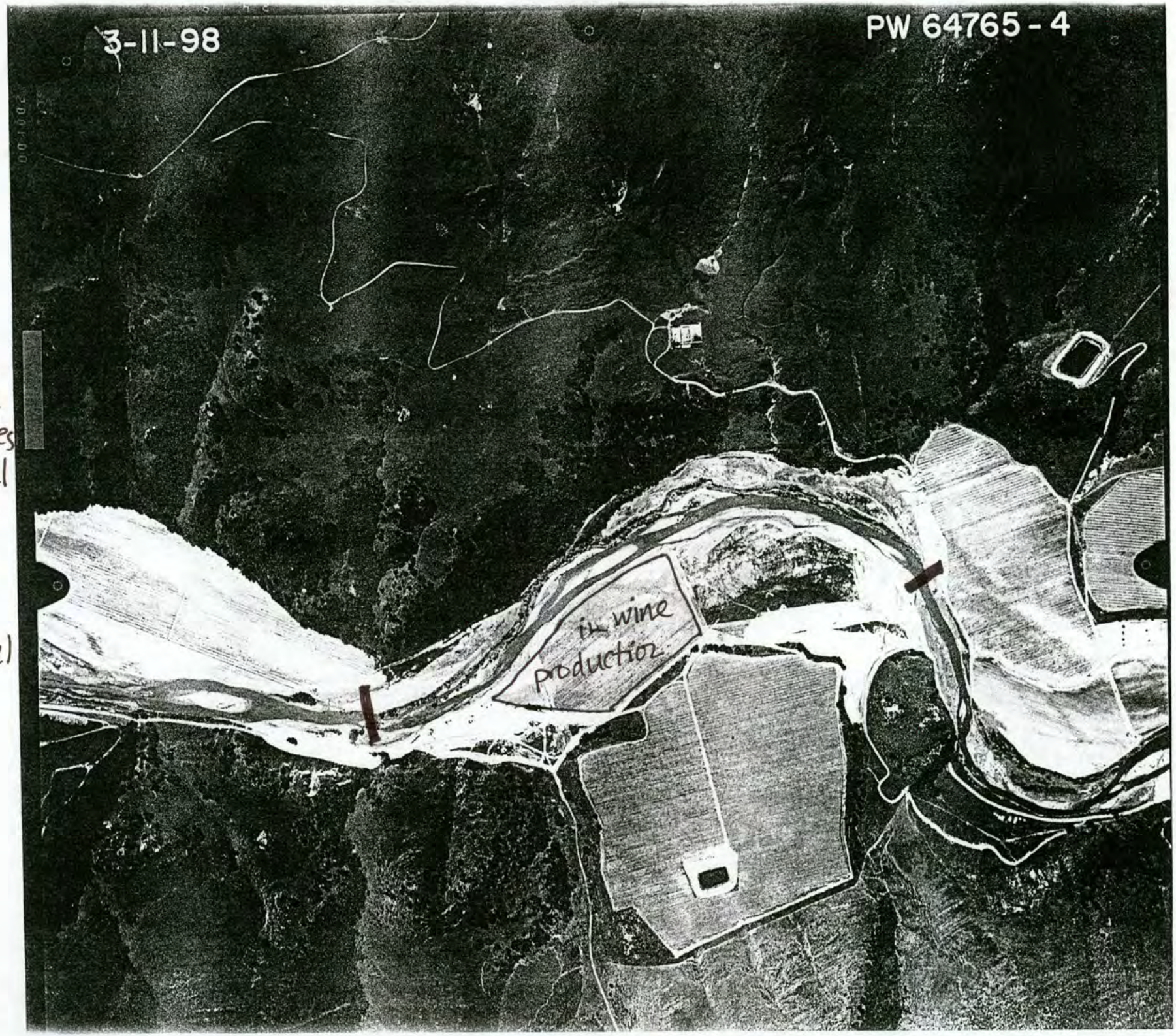
BH 4/3/98
for CASTANON
CESPL-CO-RN



road washed out - site 1

pilot channel proposed

Note: flows go from right to left on all photos



Site 2

[redacted] delineates overbank flow.

Note:
a. area in [redacted]oduction
b. riparian vegetation that delineates "old" channel

proposal is to re-direct flow into "old" channel

Site 3

pilot channel was cut thru this upland terrace (after photo)

bank stabilization needed here; grapes lost to the river; see text description & notes

3084

Twitchell Dam & Reservoir

4084

Environmental General Counsel LLP
Joshua A. Bloom, Partner

By Email (publicaffairs.spl@usace.army.mil) and U.S. Mail

June 16, 2021

U.S. Army Corps of Engineers
Los Angeles Regulatory District
915 Wilshire Blvd.
Suite 1101
Los Angeles, CA 90017

Re: Freedom of Information Act Request

Dear Sir/Madam:

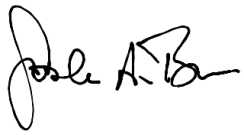
By this letter and in accordance with the federal Freedom of Information Act, 5 U.S.C. § 552, please provide the following information with respect to the impoundment at and resulting diversion of the Cuyama River, constructed between 1964 and 1977, located approximately at the northern border of 4651 Santa Maria Mesa Road, Santa Maria, California, 93454, crossed over by the eastern spur of White Rock Lane, coordinates 34°54'20.3"N 120°18'08.6"W 34.905634, -120.302399, and roughly 2,500 feet to the east of the Cuyama River's confluence with the Sisquoc River, including any maintanence of or revisions to the impoundment and diversion, from 1964 to the present:

- Any and all documents, including correspondence, maps, memoranda, approvals, authorizations, disapprovals, and filings, including without limitation, those associated with:
    - Permit applications, including all attachments, relating to, without limitation, Clean Water Act section 404 permits or approvals under the Rivers and Harbors Act associated with the diversion or impoundment ;
    - Permits relating to, without limitation, Clean Water Act section 404 permits or approvals under the Rivers and Harbors Act associated with the diversion or impoundment;
    - Any other authorizations permitting the diversion or impoundment.
    - Any investigations relating to the diversion or impoundment.
    - Any administrative or judicial enforcement, or civilian or other complaints, relating to the diversion or impoundment.

By this letter we further provide our agreement to pay any applicable fees associated with this FOIA request. Please contact me at jbloom@egcounsel.com or 510-495-0418 if you have any questions.

Thank you.

Sincerely,



Joshua A. Bloom

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOS ANGELES DISTRICT
915 WILSHIRE BOULEVARD, SUITE 930
LOS ANGELES, CALIFORNIA 90017-3489

REPLY TO
ATTENTION OF

July 27, 2021

Office of
District Counsel

Joshua Bloom
Environmental General Counsel LLP
2120 University Avenue
Berkeley, CA 94704
jbloom@egcounsel.com
510-495-0418

RE: FOIA 21-0083

Dear Mr. Bloom,

This letter concerns your Freedom of Information Act (FOIA) request dated June 16, 2021. Your request has been assigned number FA-21-0083, copy enclosed. Please use this reference number in any further correspondence.

You have requested documents related to the above-referenced subject. After conducting an extensive search, no responsive documentation has been found in the Los Angeles District. Your current FOIA request will be administratively closed; no further action is required. If you have any further questions, please contact me by email at hannah.gae@usace.army.mil

Sincerely,

HAnnah Gae

Hannah Gae
Paralegal Specialist

Enclosure