CAL CalCannabis Cultivation Licensing

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Draft Program Environmental Impact Report

State Clearinghouse #: 2016082077

Volume One: Main Body

Prepared for:

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Executive Summary

In late 2015, the California State Legislature passed, and Governor Jerry Brown signed into law, the Medical Cannabis Regulation and Safety Act (MCRSA).[1] This act, initially consisting of three separate bills (Assembly Bill [AB] 243 [2015], AB 266 [2015], and Senate Bill [SB] 643 [2015]) and subsequently amended, outlines a new structure for regulation and enforcement of medical cannabis production and use in California. On November 8, 2016, California voters passed Proposition 64 (the Adult Use of Marijuana Act [AUMA]), legalizing the use and possession of nonmedical cannabis products within California by adults aged 21 years and older.

Both acts establish a regulatory structure for cultivation, processing, manufacturing, tracking, quality control, testing, inspection, distribution, and retail sale of commercial cannabis. The acts designate applicable responsibilities for oversight of cannabis commerce to several State agencies.

It is important to note that, although California now allows for both medical and adult (nonmedical) use of cannabis, cannabis remains classified as a Schedule 1 controlled substance under the federal Controlled Substances Act of 1970. Individuals engaging in cannabis cultivation and other cannabis-related activities risk prosecution under federal law.

The California Department of Food and Agriculture (CDFA) is tasked with licensing commercial cannabis cultivation, as well as establishing a "track-and-trace" system, which involves development of a unique identifier for each plant, a reporting system, and documentation of the path of plants from cultivation to distribution as a commercial cannabis product. To accomplish this, CDFA is proposing to implement the CalCannabis Cultivation Licensing program, by establishing regulations for the medical and adult use licensing program and track-and-trace system.

CDFA has prepared this Draft Program Environmental Impact Report (PEIR) to provide an up-to-date, transparent, and comprehensive evaluation of the proposed regulations and the activities that would occur in compliance with the regulations. The PEIR will serve as an overarching California Environmental Quality Act (CEQA) framework for efficient and proactive implementation of the CalCannabis program. This PEIR is intended to provide CEQA compliance for the adoption of regulations to implement the Proposed Program. To achieve this, it considers future Proposed Program activities as described in Chapter 2, *Proposed Program Description*, and Chapter 3, *Proposed Program Activities*. CDFA will use the PEIR in deciding whether to approve, approve with modifications, or deny the Proposed Program. The regulations that CDFA is considering adopting, as they are described in this PEIR, are referred to as the "Proposed Program."

[1] Formerly known as the Medical Marijuana Regulation and Safety Act; renamed in 2016.

This PEIR is intended to provide the public, responsible agencies, and trustee agencies with information about the potential environmental effects of implementation of the Proposed Program. This Draft PEIR has been prepared in compliance with the California Environmental Quality Act (CEQA) of 1970 (as amended) and the State CEQA Guidelines (Title 14, California Code of Regulations Section 15000 et seq.).

ES.1 Overview of the Proposed Program

Goals and Objectives

The overarching goal of the Proposed Program is to establish a regulatory licensing program that would ensure that commercial cannabis cultivation operations would be performed in a manner that protects the general public, cannabis cultivation workers, and the environment from the individual and cumulative effects of these operations. Licensees must also comply with all applicable laws. An additional Program purpose is to establish a track and trace program to ensure the movement of medical and adult-use (nonmedical) cannabis items are tracked throughout the production chain.

In meeting these goals, the Proposed Program has the following objectives:

- Establish minimum requirements for indoor, outdoor, and mixed light commercial cannabis cultivation operations that must be achieved by cultivators in order to obtain a cultivation license from CDFA;
- Establish a license limit for the medium size cultivation categories;
- Require that individual and cumulative effects of water diversion and discharge associated with cultivation do not affect the instream flows needed for fish spawning, migration, and rearing, and the flows needed to maintain natural flow variability;
- Require that cultivation will not negatively impact springs, riparian wetlands, and aquatic habitats;
- Require that cannabis cultivation by licensees is conducted in accordance with applicable federal, state, and local laws related to land conversion, grading, electricity usage, water usage, water quality, woodland and riparian habitat protection, species protection, agricultural discharges, and similar matters;
- Establish procedures for the issuance and revocation of unique identifiers for activities associated with a cannabis cultivation license;
- Prescribe standards for the reporting of information as necessary related to unique identifiers;
- Establish a scale of application, licensing, and renewal fees, based upon the cost of administering and enforcing the Proposed Program; and
- Develop a cultivation checklist tool that can be used by CDFA, other agencies, and local governments to evaluate environmental impacts of cannabis cultivation license programs.

Program Area

Cannabis cultivation can occur in a combination of urban, rural, natural, and agricultural settings in the State; therefore, Proposed Program activities occur in various locations throughout California (**Figure ES-1**). The potential geographic extent of a cultivation site depends on a number of factors, including suitable climatic and ecological conditions for the cannabis plants. Cannabis cultivation can be generally divided into three basic categories – outdoor, indoor, and mixed light cultivation techniques. Processing of cannabis may occur as part of cultivation, or as a separately licensed activity. Nurseries also involve a particular type of cultivation, and are also described. A combination of these cultivation techniques may occur at one site. The location, area and extent of specific activities under the Proposed Program ultimately would vary on a site-specific basis, considering the cultivation technique, license procured, the regulatory requirements and the management approaches available.

The Proposed Program outlines specific requirements for license eligibility, including but not limited to:

- Board of Equalization seller's permit number;
- Proof of fingerprinting submission to the California Department of Justice;
- Under MCRSA, a copy of a local license, permit or other authorization from a local jurisdiction to cultivate;
- Proof of any CEQA compliance which has been completed;
- Documentation issued by the local jurisdiction in which the proposed business would be operating certifying that the applicant is or will be in compliance with all local ordinances and regulations;
- A cultivation plan detailing grow site dimensions, chemical use protocols, water source and storage, waste removal plan, inventory tracking procedures, quality control procedures, product storage and labeling, pest management plan, and details regarding the method of compliance with applicable environmental requirements;
- Proof of the legal right to occupy the proposed cultivation site;
- Proof of a bond in the amount of $5,000;
- If applicable, copy of a valid Fish and Game Code section 1602 lake or streambed alteration agreement or written verification from the Department of Fish and Wildlife that an agreement is not required;
- Evidence that the proposed cultivation site is located beyond a 600-foot radius from a school;
- Information regarding the water source for the operation operation, and if applicable, approval of water diversion and water rights; and
- For each "owner," a list of convictions and evidence of rehabilitation for each substantially related criminal conviction.

Additionally, as part of the Proposed Program, CDFA would require licensees to attest to the following:

- No owner of the business is a licensed retailer of alcoholic beverages.
- The applicant is an "agricultural employer" as defined by the Alatorre-Zenovich-Dunlap-Berman Agricultural Labor Relations Act of 1975.
- For an applicant with 20 or more employees, the applicant is entered into a Labor Peace Agreement.
- For an indoor license type, that the local fire department has been notified of the cultivation site.
- Under penalty of perjury, the information in the application is complete, true and accurate; all owners agree to operate in compliance with all applicable laws and regulations.

Summary of the Proposed Program

The Proposed Program governs the licensing of commercial indoor, outdoor, and mixed-light, processing, and nursery activities; as well as establishing a track-and-trace system, which involves development of a unique identifier for each plant, a reporting system, and documentation of the path of plants from cultivation to product distribution. The Program establishes license definitions, applications requirements, cultivation license fees and requirements, cultivation site requirements, including environmental protection measures and other environmentally beneficial provisions, and requirements related to records and reporting. Activities conducted under the Proposed Program would also be subject to inspection, investigations, audits, and enforcement of license requirements.

Licensing would involve the thorough review and approval of a proposed site-specific plan for cultivation of cannabis. Among many activities, CDFA's CalCannabis Cultivation Licensing program would be responsible for ensuring licensee compliance with relevant mitigation measure requirements determined by the environmental analysis; requiring compliance with applicable principles, guidelines and requirements established by the State Water Resources Control Board and relevant Regional Water Quality Control Boards; requiring the application of pesticides in connection with cannabis cultivation is compliant with existing pesticide use laws and regulations established by the Department of Pesticide Regulation; and requiring that individual and cumulative effects of water diversion and discharge do not affect instream flows needed for fish spawning, migration and rearing.

Horizon WATER and ENVIRONMENT

Figure ES-1
Proposed Program Area

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Table ES-1 specifies the various types of licenses that could be procured by applicants as part of the Proposed Program. Cultivation techniques are specifically defined in the Proposed Program regulations (see Chapter 2, *Proposed Program Description*). Outdoor cultivation refers to the cultivation of cannabis without the use of light deprivation and/or artificial lighting in the canopy area. Supplemental low intensity lighting is permissible only to maintain immature plants as a source for propagation. Indoor cultivation refers to the cultivation of cannabis within a structure using artificial light, at a rate greater than 25 watts per square foot. Mixed-light cultivation refers to the cultivation of cannabis using light deprivation and/or artificial lighting below a rate of 25 watts per square foot. Outdoor cultivation typically produces one harvest per year, while indoor and mixed-light cultivation can produce multiple harvests per year. Nurseries produce only clones, immature plants, seeds, and other agricultural products used specifically for the planting, propagation, and cultivation of cannabis. Processing operations covered under the processing licenses or the other cultivation license types include trimming, drying, curing, grading or packaging of cannabis and nonmanufactured cannabis products. The Proposed Program outlines license allowances and constraints for licensees, including providing a clear understanding of license combinations, total canopy size allowable for each person, as defined by MCRSA, license renewal requirements , associated fees, and reasons for denial for license approval and/or revocation.

Table ES-1. License Types

Cultivation Category	Outdoor	Indoor	Mixed
Specialty Cottage Cultivator	Up to 25 mature plants	Up to 500 sq. ft.	Up to 2,500 sq. ft.
Specialty Cultivator	Up to 5,000 square feet (sq. ft.), or up to 50 mature plants on noncontiguous plots	501 - 5,000 sq. ft.	2,501 to 5,000 sq. ft.
Small Cultivator	5,001 - 10,000 sq. ft.	5,001 - 10,000 sq. ft.	5,001 - 10,000 sq. ft.
Cultivator	10,001 sq. ft. to one acre	10,001 - 22,000 sq. ft.	10,001 - 22,000 sq. ft.
Nursery	No size Restriction	No size Restriction	No size restriction
Processor	Includes all activities associated with trimming, drying, curing, grading or packaging of cannabis and nonmanufactured cannabis products. No size or location limits.		

The Proposed Program is described in detail in Chapter 2, *Proposed Program Description*, and Chapter 3, *Proposed Program Activities*.

Nature of the Discretionary Action Considered in the PEIR

This PEIR is intended to provide CEQA compliance for the adoption of regulations to implement the Proposed Program. To achieve this, it considers future Proposed Program activities as described in Chapter 2, *Proposed Program Description*, and Chapter 3, *Proposed Program Activities*. CDFA will use the PEIR in deciding whether to approve, approve with modifications, or deny the Proposed Program. Note that many aspects of the Proposed Program are prescribed by law, and CDFA's act of discretion in adopting the regulations is therefore limited to those aspects of the regulations not specifically prescribed by law and/or those which have involved CDFA's interpretation or addition of further specificity in the regulations.

This PEIR is intended to meet CEQA requirements for CDFA's CalCannabis Cultivation Licensing program, and consider reasonably foreseeable cannabis cultivation activities associated with the Proposed Program. The Proposed Program does not attempt to capture all potential future cannabis cultivation programs, regulations, and activities, but only those that are reasonably foreseeable based on existing information regarding the status of the cultivation of cannabis for commercial purposes in the State of California.

The PEIR may be used for subsequent CEQA evaluation, to evaluate project-level cannabis cultivation activities, as well as local and regional programs, newly developed management approaches, or other emerging aspects of cannabis cultivation. Use of the PEIR to facilitate CEQA compliance for individual activities and program components will enable CDFA to efficiently implement an adaptable program. The strategy to be implemented for the Proposed Program is described further below.

CEQA Tiering Strategy

To facilitate the determination of whether applications for proposed cultivation activities and related management approaches have been sufficiently described in the Proposed Program and adequately addressed in the PEIR, a CEQA Tiering Strategy and checklist are being developed by CDFA. Using these tools, future commercial cannabis cultivation activities would be assessed to determine the extent to which potentially significant environmental impacts have been adequately addressed in this PEIR, and if not, what additional measures may be necessary.

ES.2 Public Involvement Process

Public disclosure and dialogue are priorities under CEQA and for CDFA. Accordingly, CEQA mandates two periods during the environmental impact report (EIR) process when public and agency comments on the environmental analysis of a project or program are to be solicited: during the scoping comment period and during the review period for the Draft EIR. CEQA and the State CEQA Guidelines also allow for lead agencies to hold public meetings or hearings to obtain scoping comments, and provide the public and agencies with an opportunity to review both the draft and final versions of an EIR. Brief descriptions of these milestones are provided below, as they apply to this document; for a more complete description, please refer to Chapter 1, *Introduction*.

Notice of Preparation

A Notice of Preparation (NOP) for the Medical Cannabis Cultivation Program (MCCP) was circulated on September 1, 2016, and invited the public to offer comments during the scoping period. The NOP presented general background information on the MCCP, the scoping process, the environmental issues to be addressed in the Draft PEIR, and the anticipated uses of the Draft PEIR.

Following the passage of AUMA, a revised NOP including both medical and adult-use (nonmedical) cultivation activities was circulated on April 27, 2017, and invited the public to offer comments during this second scoping period. The revised NOP presented general background information on the CalCannabis Cultivation Licensing program, the scoping process, the environmental issues being included in the Draft PEIR, and the anticipated uses of the Draft PEIR.

Scoping Comments and Workshops

During the initial (2016) scoping period, CDFA conducted eight scoping workshops across California, in Sacramento, Redding, Eureka, Oakland, San Luis Obispo, Coalinga, Pasadena, and Desert Hot Springs. These workshops welcomed input from the public and interested public agencies regarding the nature and scope of environmental impacts to be addressed in the Draft PEIR. Scoping workshop information and notices were mailed to potentially interested parties, published in local newspapers, and posted on CDFA's website before the meetings to invite attendees.

Oral comments were received at the scoping workshops in 2016; in addition, written comment letters were received during both 2016 and 2017 scoping periods. These comments have been summarized, as well as included in their entirety, in a *Scoping Summary Report*, provided in Appendix D. The information contained in the NOP (e.g., program description, range of topics) was further refined, based on the helpful input received in written and oral comments, and was reflected in the text of the Draft PEIR.

Draft EIR Public Review and Comment Period

CDFA has issued a Notice of Availability (NOA) to provide agencies and the public with formal notification that this Draft PEIR is available for review. The NOA has been sent to all responsible and trustee agencies, any person or organization requesting a copy, and all 58 county clerks' offices for posting. A legal notice has also been published in a number of general-circulation newspapers. CDFA has also submitted the NOA and a Notice of Completion (NOC) to the State Clearinghouse.

Publication of the NOA initiated a 45-day public review period, during which CDFA will receive and collate public and agency comments on the Proposed Program and the Draft PEIR. CDFA will host multiple public meetings in locations throughout the state after release of the Draft PEIR. The purpose of public circulation and the public meetings is to provide public agencies, other stakeholders, and interested individuals with opportunities to comment on or express concerns regarding the contents of the Draft PEIR.

Areas of Known Controversy

Section 15123(b)(2) of the State CEQA Guidelines requires that the summary of an EIR identify areas of controversy known to the lead agency, including issues raised by agencies and the public. Several potential effects of implementing the Proposed Program are expected to be controversial, including:

- Potential effects of the Proposed Program on the general demand and supply of commercial cannabis, and the Proposed Program's effects on existing cultivation techniques as a result of new restrictions, regulations, and requirements.
- Potential effects on day and nighttime scenic views or scenic resources from cannabis cultivation operations equipment, land clearing, and light pollution.
- Potential effects related to land clearing or conversion of farmland, agricultural, or Timber Production Zone areas to cannabis cultivation, and general compatibility between cannabis cultivation operations and other surrounding agricultural areas.
- Limited use of pesticides to those analyzed in this PEIR or a subsequent tiering document.
- Potential effects related to grower compliance with local, state, and federal air quality laws, ventilation systems and airborne contaminants, and more generally air quality impacts and emissions resulting from cultivation operations.
- Potential effects related to the protection of endangered and native species and their habitats, compliance and enforcement of appropriate biological mitigation and monitoring measures, and the effects of hazardous chemicals on biological resources.
- Potential effects on cultural and tribal cultural resources, archeological or historic resources, and general consideration of tribal community concerns.
- Potential effects resulting from high energy usage requirements, and associated greenhouse gas emissions resulting from indoor cultivation sites.
- Potential effects from the Proposed Program resulting in the spread of pests and diseases, impacts to crops and livestock, and water sources resulting from the use, transportation and storage of hazardous materials and protecting against the spillage, runoff, and drainage of these substances.
- Potential effects to human health associated with odors and noxious fumes, increased wildfire risk, proper sanitation practices, increased crime, and equipment maintenance.
- Potential effects of the Proposed Program on surface water, groundwater supply, water quality, general excessive water usage by cultivators, obstruction of natural water flows, improper wastewater disposal, illegal water usage, erosion, and runoff.
- Potential effects of the Proposed Program on land use and planning, including land compatibility, establishment of proper setbacks from sensitive receptors, and the physical division of established communities.
- Potential effects of the Proposed Program on noise levels and excessive noise exposure as a result of cannabis cultivation activities.

- Potential effects on emergency response and evacuation and costs to local and county departments for a potential need for increased law enforcement and public service agencies.
- Potential harassment and rights violations from law enforcement towards growers.
- Potential effects of the Proposed Program on the accumulation of solid waste, use of substandard septic systems, and general increased demands on existing utilities.

ES.3 Issues to Be Resolved

Section 15123(b) of the State CEQA Guidelines requires that an EIR summary identify issues to be resolved. The primary issue which is receiving consideration for resolution is the inconsistency between various provisions of MCRSA and AUMA. At the time of publication of this Draft PEIR, a trailer bill has been introduced, and is being considered for adoption by the State legislature. Should the trailer bill pass, the licensing programs may be adjusted to ensure a consistent licensing approach for both types of cultivation (medical and adult use [nonmedical]).

ES.4 Overview of Environmental Topics Evaluated in the Draft PEIR

This section presents the resource topics evaluated in the PEIR, and presents an overview of key impacts and conclusions. Environmental areas that potentially would be affected by the Proposed Program include:

- Aesthetics
- Agriculture and Forestry Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Energy Use and Greenhouse Gas (GHG) Emissions
- Hazards, Hazardous Materials, and Human Health
- Hydrology and Water Quality
- Land Use and Planning
- Noise
- Public Services
- Transportation and Traffic
- Tribal Cultural Resources
- Utilities and Service Systems

ES.5 Alternatives Considered

The purpose of the alternatives analysis in an EIR is to describe a reasonable range of potentially feasible alternatives to a proposed project that could feasibly attain most of the objectives of a proposed project while reducing or eliminating one or more of a proposed project's significant effects. The range of alternatives considered must include those that offer substantial environmental advantages over the proposed project in question, and may be feasibly accomplished in a successful manner considering economic, environmental, social, technological, and legal factors.

The following alternatives were evaluated for their potential feasibility and their ability to achieve most of the Proposed Program objectives while avoiding, reducing, or minimizing significant impacts identified for the Proposed Program:

- No Program Alternative
- No Natural Light Alternative
- No High-Intensity Grow Light Alternative
- Restricted Size Alternative

No Program Alternative

Under the No Program Alternative, CDFA would not implement the CalCannabis Cultivation Licensing program; create, issue, renew, discipline, suspend, or revoke licenses for the cultivation of cannabis; or collect fees in connection with activities regulated by the Proposed Program. CDFA would not implement the proposed track-and-trace system for the purposes of tracking commercial cannabis, nor would the agency implement the proposed reporting system, and documentation requirement imposed by such a program. For the purposes of discussion, it is assumed that existing cannabis cultivation operations (both permitted and unpermitted) would continue to operate under the existing regulatory climate. The No Program Alternative would fail to meet MCRSA and AUMA obligations, which require CDFA to adopt regulations to establish a cannabis cultivation licensing program and track-and-trace system.

Because no information exists to determine whether commercial cannabis cultivation would increase or decrease under the No Program Alternative, it is assumed to remain static in terms of the types of grow operations (outdoor, indoor, mixed light) and the extent of unpermitted operations.

The No Program Alternative would fail to meet MCRSA and AUMA obligations, requiring CDFA to establish a regulatory framework for cannabis cultivation policies, procedures, and regulations in California. CDFA would need to consider appropriate CEQA review and documentation for any new medical or adult-use (non-medical) cannabis cultivation programs that are proposed in the future.

No Natural Light Alternative

The No Natural Light Alternative would require that all cultivation be limited to the use of artificial light, and only indoor cultivation would be allowed. This would eliminate license types for outdoor and mixed-light cultivation, as both techniques rely upon natural light. As described in Chapter 3, *Proposed Program Activities*, indoor cultivation is conducted within buildings without the use of any natural light. High-intensity lighting is typically used to stimulate photosynthetic activity and plant growth, and the duration of light and darkness is manipulated to simulate and accelerate the seasonal changes in daylight that trigger various growth stages of the plant. In some cases, the intensity of light is also changed throughout a particular photoperiod to simulate the changing intensity of sunlight throughout the day. The No Natural Light Alternative would include a track-and-trace component similar to that

described for the Proposed Program. The legislature would need to amend MCRSA and AUMA to allow implementation of this alternative.

No High Intensity Grow Light Alternative

The No High-Intensity Grow Light Alternative would require that all cannabis cultivation operations use natural light and/or low-intensity artificial light. This would eliminate the license types for indoor cultivation and would restrict mixed-light cultivation to the use of low-intensity lighting. In addition, outdoor licenses would not be allowed to use high-intensity grow lights for propagation. The No High-Intensity Grow Light Alternative would include a track-and-trace component similar to that described for the Proposed Program. The legislature would need to amend MCRSA and AUMA to allow implementation of this alternative.

Restricted Size Alternative

The Restricted Size Alternative would limit the size of cultivation sites to "Specialty Cottage," "Specialty," or "Small Cultivator" sized operations, less than 10,000 square feet. This alternative was suggested during the Draft PEIR scoping process. This would eliminate the issuance of medium cultivation licenses, would eliminate the issuance of licenses for large outdoor cultivation. The Restricted Size Alternative would include a track-and-trace component similar to that described for the Proposed Program. The legislature would need to amend MCRSA and AUMA to allow implementation of this alternative.

Environmentally Superior Alternative

Considering all environmental aspects, the Proposed Program is considered to be environmentally superior to any of the alternatives. It strikes a balance between the various environmental issues and ensures that impacts would not be significant. It is important to note that the California State Legislature and the voters, in adopting MCRSA and AUMA, respectively, directed CDFA to develop regulations, to address environmental impacts of commercial cultivation, and these considerations have guided the development of the Proposed Program.

From among the alternatives, the No High-Intensity Grow Light Alternative is considered environmentally superior. This alternative would focus cultivation activities on outdoor and mixed-light techniques using natural lighting and would prohibit indoor cultivation and some mixed-light cultivation techniques that rely solely or partially on high-intensity grow lights. Therefore, this alternative would lead to a substantial reduction in energy use and related air quality and GHG emissions associated with indoor cultivation. It would also avoid the various fire and health risks associated with indoor cultivation. Because indoor cultivation typically occurs in more urban settings, impacts in these locations may be reduced, although if they were replaced with outdoor or mixed-light cultivation in urban settings, this could create greater security issues, as these operations are easier to detect. The No High-Intensity Grow Light Alternative could also result in other adverse environmental impacts. Outdoor and mixed-light cultivation sites are typically located in more rural settings, with greater potential for aesthetic impacts, forestland conversion, and effects on biological resources, cultural resources, hydrology and water quality, noise, and

tribal cultural resources. However, compliance with Proposed Program requirements, other applicable laws and regulations, and requirements from local jurisdictions would ensure that such impacts would not be significant.

The other alternatives were not selected as the environmentally superior alternative for the following reasons:

No Program Alternative. Because a greater number of unpermitted cultivators would continue to operate under this alternative, it would result in impacts due to noncompliance with requirements related to water use, illegal use of pesticides, waste disposal, and illegally obtained energy. In addition, the activities of permitted growers would not benefit from the implementation of environmental protection measures contained within the Proposed Program regulations. As a result, impacts would be greater overall than those of either the Proposed Program or the No High-Intensity Grow Light Alternative (the Environmentally Superior Alternative), including the significant noise and biological resources impacts of the Proposed Program, rendering this alternative less environmentally desirable.

No Natural Light Alternative. This alternative would avoid potential impacts associated with outdoor and mixed-light cultivation techniques, which rely on natural light, and instead would encourage the use of indoor cultivation techniques that utilize artificial lighting. This would generally lead to a reduction of impacts in more rural settings, where outdoor and mixed-light cultivation is much more common. These reduced impacts may include issues such as aesthetics, biological resources, cultural resources, hydrology and water quality, forest conversion, noise, and tribal cultural resources. However, the No Natural Alternative could also result in other adverse environmental impacts. Because indoor cultivation methods rely heavily on high-intensity grow lights and other equipment to regulate indoor artificial environments, this alternative would result in greater impacts related to energy use, air quality, and GHG emissions. Additionally, indoor practices are much more commonly associated with fire and other health risks, such as elevated levels of mold and CO_2. These offsetting adverse effects from a potential increase in indoor cultivation as a result of restricting outdoor and mixed-light cultivation render this alternative less environmentally desirable than either the Proposed Program or the No High-Intensity Grow Light Alternative (the Environmentally Superior Alternative).

Restricted Size Alternative. This alternative would generally reduce potential impacts at any given site but there may be a larger number of sites, which may collectively have similar impacts to the Proposed Program. It is unclear whether this alternative would reduce the significant biological resources or noise impacts of the Proposed Program. Therefore, this alternative was not selected as environmentally superior as it did not deviate meaningfully from the Proposed Program and would not avoid the substantial impacts addressed by the No High-Intensity Grow Light Alternative (the Environmentally Superior Alternative).

ES.6 Submittal of Comments

The purpose of circulating the Draft PEIR is to provide agencies and interested individuals with opportunities to comment on or express concerns regarding its contents and analysis. During the public review period, CDFA will be holding public meetings, which will have the same purpose. Specific dates, times, and locations for these meetings will be provided in the NOA, on CDFA's website (calcannabis.cdfa.ca.gov), and in newspaper notices.

For those interested, written comments or questions concerning this Draft PEIR should be submitted (preferably via email in Microsoft Word format) within this review period and directed to the following:

Attention: Amber Morris
CalCannabis Cultivation Licensing Program Comments
California Department of Food and Agriculture
1220 N Street, Suite 400
Sacramento, CA 95814
Email: calcannabis.peir@cdfa.ca.gov

This CEQA document is available for review at the Proposed Program website: calcannabis.cdfa.ca.gov. In addition, hard copies can be reviewed at CDFA's offices in Sacramento, California. To arrange to view documents during business hours, call (916) 263-0801. This Draft PEIR also can be reviewed electronically at libraries throughout the state that are serving as document repositories; a full list of locations is provided on the Proposed Program website.

Written comments received in response to the Draft PEIR during the public review period will be addressed in the Response to Comments chapter of the Final PEIR. Comments submitted to CDFA, and the commentor's name, are considered public information. Contact information will be redacted, and the commentor's name can also be redacted by providing a request in the comment.

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Table ES-2. Summary of Impacts and Mitigation

Impact	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
Aesthetics			
AES-1: Result in a substantial adverse effect on a scenic vista, scenic resource, or State-designated scenic highway, and/or the existing visual character or quality of a site and its surroundings.	LTS	None required	LTS
AES-2: Create a new source of substantial light or glare as a result of outdoor security lighting.	LTS	None required	LTS
AES-3: Create a new source of substantial light or glare as a result of indoor cultivation techniques.	LTS	None required	LTS
AES-4: Create a new source of substantial light or glare as a result of mixed-light cultivation.	LTS	None required	LTS
Agriculture and Forestry Resources			
AG-1: Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to nonagricultural use.	NI	None required	NI
AG-2: Convert farmland to cannabis cultivation from other crops.	LTS	None required	LTS
AG-3: Potential conflict with existing zoning for agricultural use or Williamson Act contract.	LTS	None required	LTS
AG-4: Conflict with existing zoning for, or cause rezoning of, forest land, timberland, or timberland zoned for timberland production.	LTS	None required	LTS
AG-5: Cause loss of forestland or conversion of forestland to nonforest uses.	LTS	None required	LTS
AG-6: Involve other changes in the existing environment that, because of their location or nature, could result in conversion of farmland to nonagricultural use or conversion of forest land to nonforest use.	LTS	None required	LTS

Impact	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
Air Quality			
AQ-1: Conflict with or obstruct implementation of an applicable air quality plan, and/or violate any air quality standard or contribute substantially to an existing or projected air quality violation.	LTS	None required	LTS
AQ-2: Expose sensitive receptors to substantial pollutant concentrations as a result of cannabis cultivation.	LTS	None required	LTS
AQ-3: Create objectionable odors affecting a substantial number of people as a result of cannabis cultivation.	LTS	None required	LTS
Biological Resources			
BIO-1: Cause adverse effects on aquatic and semi-aquatic special-status species.	LTS	None required	LTS
BIO-2: Cause substantial adverse effects on special-status plant species.	LTS	None required	LTS
BIO-3: Cause substantial adverse effects on wildlife due to increased light, including special-status terrestrial wildlife species.	LTS	None required	LTS
BIO-4: Cause substantial adverse effects on special-status terrestrial wildlife species due to increased noise and human presence.	LTS	None required	LTS
BIO-5: Cause substantial adverse effects on riparian habitat, other sensitive natural communities, or federally protected wetlands.	LTS	None required	LTS
BIO-6: Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or wildlife corridor, or impede the use of native wildlife nursery sites.	LTS	None required	LTS
BIO-7: Conflict with applicable habitat conservation plans or natural community conservation plans.	LTS	None required	LTS

Impact	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
BIO-8: Conflict with local policies or ordinances protecting biological resources.	NI	None required	NI
BIO-9: Cause substantial adverse effects on wildlife due to pesticide use (besides rodenticides).	LTS	None required	LTS
BIO-10: Cause substantial adverse effects on wildlife due to rodenticide use.	LTS	None required	LTS
BIO-11: Cause substantial adverse impact on nesting birds as a result of outdoor cultivation.	LTS	None required	LTS
Cultural Resources			
CR-1: Cause substantial adverse impacts on historical resources, archaeological resources, and human remains.	S	CR-1: Suspend Cultivation Immediately if Cultural Resources are Discovered, Evaluate All Identified Cultural Resources for CRHR Eligibility, and Implement Appropriate Mitigation Measures for Eligible Resources.	LSM
Energy Use and Greenhouse Gas Emissions			
GHG-1: Potential to conflict with an applicable plan, policy, or regulation adopted to reduce the emissions of GHGs, result in wasteful, inefficient, and unnecessary consumption of energy, or cause a substantial increase in energy demand and the need for additional energy resources.	Beneficial	None required	Beneficial
GHG-2: Use off-road equipment and motor vehicles for outdoor cultivation activities, resulting in GHG emissions.	NI	None required	NI
Hazards, Hazardous Materials, and Human Health			
HAZ-1: Release hazardous materials from routine transport, use, and disposal.	LTS	None required	LTS
HAZ-2: Create a significant hazard through release of hazardous materials from upset or accident conditions.	LTS	None required	LTS
HAZ-3: Cause health risks from pesticide use.	LTS	None required	LTS
HAZ-4: Emit hazardous emissions or materials within 0.25 mile of a school.	LTS	None required	LTS

Impact	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
HAZ-5: Locate project activities on a hazardous materials site.	LTS	None required	LTS
HAZ-6: Locate project activities near an airport or private airstrip such as to increase hazards.	LTS	None required	LTS
HAZ-7: Expose people or structures to substantial risk of loss from wildfire.	LTS	None required	LTS
HAZ-8: Create substantial hazards for firefighters and first responders from indoor cultivation.	LTS	None required	LTS
Hydrology and Water Quality			
HWQ-1: Cause adverse effects on beneficial uses from surface water diversions for crop irrigation, or cause insufficiency of surface water supplies.	LTS	None required	LTS
HWQ-2: Cause aquifer depletion from use of groundwater for crop irrigation and result in insufficiency of groundwater supplies.	LTS	None required	LTS
HWQ-3: Cause discharges of sediment, nutrients, or other contaminants (excluding pesticides) from outdoor or mixed-light cultivation.	LTS	None required	LTS
HWQ-4: Cause water quality impacts from pesticide use in outdoor or mixed-light cultivation.	LTS	None required	LTS
HWQ-5: Cause discharges of sediment, nutrients, and other contaminants (excluding pesticides) from indoor cultivation operations.	LTS	None required	LTS
HWQ-6: Cause water quality impacts from pesticide use in indoor cultivation.	LTS	None required	LTS
Land Use and Planning			
LU-1: Physically divide an established community.	LTS	None required	LTS
LU-2: Conflict with applicable land use plans, policies, or regulations.	LTS	None required	LTS

Impact	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
Noise			
NOI-1: Expose people or residences to excessive noise levels within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport.	LTS	None required	LTS
NOI-2: Use mechanical equipment for the cultivation of cannabis resulting in generation of excessive groundborne vibration or groundborne noise levels.	LTS	None required	LTS
NOI-3: Use of mechanical equipment for the cultivation of cannabis resulting in a substantial permanent increase in ambient noise levels in the vicinity of a Proposed Program activity above levels existing without the Proposed Program.	LTS	None required	LTS
NOI-4: Use mechanical equipment for the cultivation of cannabis resulting in excessive noise for sensitive receptors, and/or resulting in a substantial temporary or periodic increase in ambient noise levels.	LTS	None required	LTS
Public Services			
PS-1: Cause a substantial adverse impact related to police protection services.	LTS	None required	LTS
PS-2: Cause a substantial adverse impact related to schools.	LTS	None required	LTS
PS-3: Cause a substantial adverse impact related to parks or other public services.	LTS	None required	LTS
PS-4: Cause a substantial adverse impact related to fire protection services from outdoor cultivation.	LTS	None required	LTS
PS-5: Cause a substantial adverse impact related to fire protection services from indoor cultivation.	LTS	None required	LTS
PS-6: Cause a substantial adverse impact related to fire protection services from mixed-light cultivation.	LTS	None required	LTS

Impact	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
Transportation and Traffic			
TRA-1: Conflict with circulation plans, ordinances, or policies.	LTS	None required	LTS
TRA-2: Conflict with congestion management programs.	LTS	None required	LTS
TRA-3: Result in a change to air traffic patterns.	LTS	None required	LTS
TRA-4: Increase hazards due to a design feature or incompatible uses.	LTS	None required	LTS
TRA-5: Result in effects on emergency access.	LTS	None required	LTS
TRA-6: Result in effects related to public transit, bicycle, or pedestrian facilities.	LTS	None required	LTS
Tribal Cultural Resources			
TCR-1: Cause a substantial adverse impact on tribal cultural resources.	S	TCR-1: Consult with Native American Tribes and Prepare and Implement Treatment Plans for any TCRs Identified at the Site.	LSM
Utilities			
UTL-1: Exceed wastewater treatment requirements, result in expansion of wastewater treatment facilities, or result in a determination by the wastewater treatment provider that it has inadequate capacity to serve Proposed Program activities.	LTS	None required	LTS
UTL-2: Require or result in the construction of new or expanded water treatment facilities.	LTS	None required	LTS
UTL-3: Require or result in the construction of new or expanded stormwater facilities.	LTS	None required	LTS
UTL-4: Potential to be served by a landfill with insufficient capacity.	LTS	None required	LTS
UTL-5: Failure to comply with existing statutes related to solid waste.	LTS	None required	LTS

Notes: LSM = less than significant with mitigation incorporated; LTS = less than significant; NI = no impact; S = significant.

Chapter 1
Introduction

The California Department of Food and Agriculture (CDFA) has prepared this Draft Program Environmental Impact Report (PEIR) to provide the public, responsible agencies, and trustee agencies with information about the potential environmental effects of the CalCannabis Cultivation Licensing program (Proposed Program).

The Proposed Program involves adoption of regulations to establish and implement a licensing program for medical and adult-use (nonmedical) cannabis cultivation and a track-and-trace system to monitor the movement of cannabis and cannabis products from seed to sale, in compliance with the requirements of the Medical Cannabis Regulation and Safety Act (MCRSA) and the Adult Use of Marijuana Act (AUMA). The purpose of the Proposed Program is to ensure that medical and adult-use cannabis cultivation operations would be performed in a manner that protects the environment, cannabis cultivation workers, and the general public from the individual and cumulative effects of these operations and complies with all applicable State and local laws, as well as federal laws (with the exception of the Controlled Substances Act of 1970). An additional purpose of the program is to establish a track-and-trace program to ensure the movement of cannabis items are tracked throughout the production chain.

This Draft PEIR has been prepared in compliance with the California Environmental Quality Act of 1970 (CEQA) (as amended; Title 14, California Code of Regulations [CCR], Section 21000 et seq.) and the State CEQA Guidelines (14 CCR Section 15000 et seq.). The primary purpose of this Draft PEIR is to provide comprehensive and transparent, programmatic CEQA coverage for the adoption of regulations, which will inform implementation and environmental review of licensing activities conducted pursuant to the Proposed Program.

1.1 General Overview

In late 2015, the California State Legislature passed, and Governor Jerry Brown signed into law, MCRSA. This act, initially consisting of three separate bills (Assembly Bills 243 and 266 and Senate Bill 643) and subsequently amended, outlines a new structure for regulation and enforcement of medical cannabis production and use in California. MCRSA establishes a regulatory structure for cultivation, processing, manufacturing, tracking, quality control, testing, inspection, distribution, and retail sale of commercial cannabis. The act identifies various State agency responsibilities and tasks CDFA with licensing medical cannabis cultivation and establishing a track-and-trace system that requires use of unique identifiers for every applicable cannabis plant and cannabis product, a reporting system, fees, and system for documenting the path of plants from cultivation to distribution as medicinal cannabis products. MCRSA establishes licensing procedures for various aspects of the production process.

In November 2016, California voters approved Proposition 64, the AUMA, a ballot initiative allowing adults aged 21 years old or older to possess and use nonmedical cannabis. AUMA

creates a comprehensive system to license, control, and regulate the cultivation, processing, manufacture, distribution, testing, and sale of adult-use cannabis. CDFA's role under AUMA is to establish cannabis cultivation licensing regulations, similar to those drafted under MCRSA, including the expansion of the track-and-trace system to include adult-use cannabis products.

It is important to note that, although California now allows for both medical and adult (nonmedical) use of cannabis, cannabis remains classified as a Schedule 1 controlled substance under the federal Controlled Substances Act of 1970. Individuals engaging in cannabis cultivation and other cannabis-related activities risk prosecution under federal law.

CDFA's proposed regulations to implement its obligations under MCRSA are provided as **Appendix A** of this Draft PEIR. CDFA has not yet published proposed regulations related to cannabis cultivation for adult use under AUMA; Chapter 2, *Proposed Program Description,* Section 2.3 summarizes the primary differences between MCRSA and AUMA for the licensing of cannabis cultivation. MCRSA and AUMA are included in their entirety (including subsequent amendments; current as of December 31, 2016) as **Appendices B and C**, respectively.

1.2 Overview of Activities Conducted under the Proposed Program

To meet CDFA's obligations under MCRSA, CDFA has developed proposed regulations that:

- Define key terms used in regulations for medical cannabis cultivation;
- Detail cultivation license types and their cultivation requirements;
- Specify the license application requirements and process under the Proposed Program;
- Identify allowable license combinations and limits, and the processes for license renewal, denial, or revocation;
- Establish cultivation license fees;
- Establish environmental protection measures;
- Describe CDFA's inspection, investigation, and enforcement processes for licensed cultivation sites and licensees; and
- Specify requirements for cannabis cultivation licensees and any receiving licensees under the track-and-trace system.

The regulations that CDFA will develop pursuant to the AUMA are expected to substantially mirror the proposed MCRSA regulations and accomplish the same general purposes listed above. Public comments received and subsequent revisions to the regulations will apply to both sets of regulations.

For cannabis cultivation, five general categories of license types will be issued: four categories distinguished by type of cultivation (outdoor, indoor, mixed-light, and nursery) and one category for processing of cannabis. Within these categories, different licenses will be issued based on factors such as canopy size, number of mature plants, and whether the cannabis is being cultivated for the purposes of medical use or adult (nonmedical) use.

CDFA would review cultivation license applications and issue or deny licenses, inspect cultivation and processing sites to determine compliance with regulatory requirements, and implement enforcement actions, which could include investigations, penalties, licensing actions, and/or destruction of cannabis plants and products.

The track-and-trace component of the Proposed Program would require that licensees tag each of their cannabis plants and subsequent cannabis products with unique identifiers so that any movement of cannabis or cannabis products may be traced throughout the distribution chain between licensees. All licensees—including those associated with aspects of cannabis commerce besides cultivation and licensed by other state agencies—would be required to use this system. In its proposed regulations, CDFA has established specific requirements for information that must be reported by the licensee for each movement of cannabis, as well as by the receiving licensee of any cannabis product.

1.3 Overview of CEQA Requirements

CEQA's basic purposes are to:

- Inform governmental decision-makers and the public about the potential significant environmental effects of proposed activities;
- Identify the ways that environmental damage can be avoided or substantially reduced;
- Prevent significant, avoidable damage to the environment by requiring the implementation of feasible mitigation measures or alternatives that would substantially lessen any significant effects that a project would have on the environment; and
- Disclose to the public the reasons why a governmental agency approved the project in the manner the agency chose if significant environmental effects are involved.

As described in the State CEQA Guidelines (Section 15121[a]), an environmental impact report (EIR) is an informational document that assesses potential environmental effects of a proposed project (or program) and identifies mitigation measures and alternatives to the project that could reduce or avoid potentially significant environmental impacts. Other key CEQA requirements include developing a plan for implementing and monitoring the success of the identified mitigation measures and carrying out specific public notice and distribution steps to facilitate public involvement in the environmental review process. As an informational document, an EIR is not intended to recommend either approval or denial of a project. An EIR does not expand or otherwise provide independent authority for the lead agency to impose mitigation measures or avoid project-related significant environmental impacts beyond the authority already within the lead agency's jurisdiction.

CDFA is the lead agency under CEQA for preparation of this PEIR for adopting State cannabis cultivation regulations.

1.4 Scope and Intent of this Document

An overview of the CalCannabis Cultivation Licensing program's proposed regulations is provided in this Draft PEIR in Chapter 2, *Proposed Program Description.* Cannabis cultivation activities as they would be implemented in the future pursuant to the Proposed Program (if CDFA approves the regulations following completion of this CEQA process) are identified in this Draft PEIR in Chapter 3, *Proposed Program Activities.*

Adoption of discretionary regulations constitutes a "project" subject to CEQA (see State CEQA Guidelines Section 15378[a][1]). Note that many aspects of the Proposed Program are prescribed by law. CDFA's act of discretion in adopting the regulations is therefore limited to those aspects of the regulations not specifically prescribed by law and/or those that have involved CDFA's interpretation or addition of further specificity in the regulations.

CDFA will use the analyses presented in this Draft PEIR, public and regulatory agency comments received on the Draft PEIR, and the entire administrative record to evaluate the Proposed Program's environmental impacts as well as to inform and support CDFA's further modifications, approval, or denial of the Proposed Program.

1.4.1 Type of EIR: Program EIR

This PEIR, when finalized and certified, will serve as a program-level EIR in accordance with State CEQA Guidelines Section 15168 or as a first-tier EIR prepared in accordance with State CEQA Guidelines Section 15152. The PEIR will provide a foundation for subsequent, more detailed evaluation of individual activities conducted under the Proposed Program. One of CDFA's intentions in preparing the PEIR is to minimize the amount of duplicate information that may be required in the future when considering site-specific issues associated with license applications by dealing as comprehensively as possible at the program level with the impacts of the Proposed Program, including cumulative impacts, considering regional issues and similar overarching issues. In general, while substantial efforts have been made to provide as specific an analysis as possible, project-level detail was generally not available or feasible to provide, because of the large number of cultivation sites around the State, the uncertainty regarding which cultivators may seek a license under the Proposed Program at which locations, and the potential range of site-specific environmental issues which cannot be predicted without a site-specific proposal without being unduly speculative.

According to State CEQA Guidelines Section 15168(c)(5), "[a] program EIR will be most helpful in dealing with subsequent activities if it deals with the effects of the program as specifically and comprehensively as possible." Later environmental documents prepared by the city, county, or project proponent (applicant) (EIRs, mitigated negative declarations, or negative declarations) can incorporate by reference materials from the PEIR regarding regional influences, secondary impacts, cumulative impacts, broad alternatives, and other factors (State CEQA Guidelines Section 15168[d][2]). These later documents need to focus only on evaluating the potential for significant impacts, such as site-specific impacts, that

were not already considered in the PEIR or other CEQA document to which the site-specific document is tiered (State CEQA Guidelines Section 15168[d][3]).

In addition, State CEQA Guidelines Section 15168(c) states:

> Subsequent activities in the program must be examined in the light of the program EIR to determine whether an additional environmental document must be prepared.
>
> 1. 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.
> 2. If the agency finds that pursuant to Section 15162, no new effects could occur or no new mitigation measures would be required, the agency can approve the activity as being within the scope of the project covered by the program EIR, and no new environmental document would be required.
> 3. An agency shall incorporate feasible mitigation measures and alternatives developed in the program EIR into subsequent actions in the program.
> 4. Where the subsequent activities involve site specific operations, the agency should use a written checklist or similar device to document the evaluation of the site and the activity to determine whether the environmental effects of the operation were covered in the program EIR.

CDFA will prepare written checklists for future Proposed Program activities (e.g., for individual licenses) as necessary to determine to what extent the environmental review for such activities may rely on the PEIR. State CEQA Guidelines Section 15152 provides that, where a first-tier EIR has "adequately addressed" the impacts of the activity, such impacts need not be revisited in a tiered document. Furthermore, tiered documents may limit the examination of impacts to those that "were not examined as significant effects" in the prior EIR or "[a]re susceptible to substantial reduction or avoidance by the choice of specific revisions in the project, by the imposition of conditions, or other means." In general, significant environmental effects have been "adequately addressed" if the lead agency determines that:

> A. They have been mitigated or avoided as a result of the prior EIR and findings adopted in connection with that prior EIR; or
> B. They have been examined at a sufficient level of detail in the prior EIR to enable those effects to be mitigated or avoided by site-specific revisions, the imposition of conditions, or other means in connection with the approval of the later project.

Accordingly, new analyses for future Proposed Program activities would focus on issues and impacts not "adequately addressed" in the PEIR under the meaning of the CEQA statute and State CEQA Guidelines. The new analyses for these future activities would address impacts that cannot be "avoided or mitigated" by mitigation measures that either (1) were adopted in connection with the Proposed Program or (2) were formulated based on information in

the PEIR. CDFA expects that such tiered analysis containing a site-specific review would most often be prepared by local agencies with approval authority over cultivation as the time they either (1) develop regulatory programs for cultivation, and/or (2) consider issuance of individual approvals. In these scenarios, CDFA may act as a responsible agency in making findings on the CEQA document prepared by the local agency (following the procedure outlined in CEQA Guideline 15096), and/or tier from the local agency's document. That said, there may be circumstances where CDFA would be the sole licensing authority and may act as the lead agency for a tiered analysis. In these cases, applicants may prepare information or documentation for CDFA's use in completing a tiering process. Section 1.4.2, "CEQA Tiering Strategy," further discusses tiering.

1.4.2 CEQA Tiering Strategy

To assist CDFA with evaluation of individual cultivation license applications for adequate CEQA compliance, CDFA will develop a CEQA Tiering Strategy. The CEQA Tiering Strategy will include a series of questions or directions to (a) determine the extent to which the activities were considered in this PEIR or another CEQA document(s) (e.g., one completed by a local agency as part of its approval process); (b) identify applicable requirements from the PEIR and any other relevant CEQA documents; (c) indicate the method by which CDFA will make findings upon and adopt relevant mitigation measures contained within other CEQA documents; and (d) determine tiering needs for activities with significant impacts that were not disclosed in the PEIR or another CEQA document. The CEQA Tiering Strategy will also include a checklist to be used for documenting the conclusions of such evaluations. The checklist will be accompanied by guidelines to assist those completing the checklist and evaluating Proposed Program activities for conformity with the PEIR, and to assist with project-specific CEQA compliance in general.

Tiered CEQA documents are required to follow CEQA's public participation requirements, which vary based on the type of tiered document. Thus, the CEQA Tiering Strategy does not eliminate or preclude any opportunity for public review or comment.

1.5 Public Involvement Process

CEQA mandates two periods during the EIR process when public and agency comments on the environmental analysis of the Proposed Program are to be solicited: during the scoping comment period and during the review period for the Draft PEIR. CEQA and the State CEQA Guidelines also allow for lead agencies to hold public meetings or hearings to obtain scoping comments and review both the draft and final versions of an EIR. Brief descriptions of these milestones are provided below, as they apply to this document.

1.5.1 Notice of Preparation

A Notice of Preparation (NOP) for the Proposed Program was prepared in accordance with State CEQA Guidelines Section 15082 and was circulated on September 1, 2016. At the time of circulation of the NOP, AUMA had not passed, and the Proposed Program was focused solely on medical cannabis cultivation and the track-and-trace system. The NOP presented general background information on the Proposed Program, the scoping process, a table of

contents and outline of CDFA's preliminary regulations under MCRSA, environmental issues to be addressed in the Draft PEIR, and the anticipated uses of the PEIR.

The NOP invited the public to offer comments during the scoping period, and the scoping comments received during this period were considered in the *Scoping Summary Report* (**Appendix D**). A copy of the NOP is provided in the *Scoping Summary Report.*

1.5.2 Scoping Comments and Workshops

To provide the public and regulatory agencies with opportunities to ask questions and submit comments on the scope of the Draft PEIR, public scoping workshops were held during the NOP review period. CDFA conducted eight scoping workshops across the state. These workshops provided opportunities for the public and interested public agencies to offer input regarding the nature and scope of environmental impacts to be addressed in the Draft PEIR. Approximately 975 people attended the workshops.

Scoping workshop information and notices were mailed to potentially interested parties, published in local newspapers, and posted on CDFA's website before the workshops, to invite attendees.

The scoping workshop dates, times, and locations were as follows:

Sacramento, California: September 13, 2016, 4:00–7:00 p.m., Sacramento Convention Center (1400 J Street, Sacramento, CA 95814)

San Luis Obispo, California: September 21, 2016, 4:00–7:00 p.m., Courtyard by Marriott (1605 Calle Joaquin, San Luis Obispo, CA 93405)

Redding, California: September 14, 2016, 4:00–7:00 p.m., Red Lion Hotel (1830 Hilltop Drive, Redding, CA 96002)

Coalinga, California: September 22, 2016, 4:00–7:00 p.m., Harris Ranch (24505 West Dorris Avenue, Coalinga, CA 93210)

Eureka, California: September 15, 2016, 4:00–7:00 p.m., Red Lion Hotel (Pacific Room, 1929 4th Street, Eureka, CA 95501)

Pasadena, California: September 27, 2016, 4:00–7:00 p.m., Pasadena Convention Center (300 East Green Street, Pasadena, CA 91101)

Oakland, California: September 20, 2016, 4:00–7:00 p.m., Oakland Marriott (1001 Broadway, Oakland, CA 94607)

Desert Hot Springs, California: September 28 2016, 4:00–7:00 p.m., Miracle Springs Resort and Spa (10625 Palm Drive, Desert Hot Springs, CA 92240)

All the scoping workshops used the same open format, and interested parties were invited to attend one or all of the workshops. At each workshop, a certified court reporter was available to take oral comments. In addition to oral comments, CDFA accepted written

comments during the workshops. Comment forms were distributed at the scoping workshops for submission of written comments during or after the workshop.

A total of 47 individuals provided oral comments to the court reporters at the scoping workshops, and 20 people submitted comment cards during these meetings; in addition, 321 comment letters were received during the scoping period. These comments have been summarized, and included in their entirety, in the *Scoping Summary Report* provided in Appendix D. The information contained in the NOP (e.g., program description, range of topics) was further refined based on input received in written and oral comments and is reflected in the text of this Draft PEIR.

1.5.3 Revised Notice of Preparation

Following the passage of Proposition 64 (AUMA) in November 2016, CDFA expanded its proposed cultivation licensing program to include adult-use cannabis cultivation. As a result, CDFA expanded the scope of its PEIR to include its activities for both medical and adult-use cannabis. To ensure that agencies and the public had a full opportunity to provide early input on the PEIR in light of this expanded program scope, a Revised NOP for the Proposed Program was prepared in accordance with State CEQA Guidelines Section 15082 and was circulated on April 27, 2017. The Revised NOP presented general background information on the Proposed Program, the scoping process, a summary of CDFA's regulations under MCRSA and AUMA, environmental issues to be addressed in the Draft PEIR, and the anticipated uses of the PEIR. A copy of the Revised NOP is provided in the *Scoping Summary Report* (Appendix D), along with copies of the scoping comments received and a summary of these comments.

1.5.4 Draft EIR Public Review and Comment Period

CDFA has issued a Notice of Availability (NOA) to provide agencies and the public with formal notification that this Draft PEIR is available for review. The NOA has been sent to all responsible and trustee agencies, any person or organization requesting a copy, and all 58 county clerks' offices for posting. A legal notice has also been published in a number of general-circulation newspapers. CDFA has also submitted the NOA and a Notice of Completion (NOC) to the State Clearinghouse.

Publication of the NOA initiated a 45-day public review period, during which CDFA will receive and collate public and agency comments on the Proposed Program and the Draft PEIR. CDFA will host multiple public meetings in locations throughout the state after release of the Draft PEIR. The purpose of public circulation and the public meetings is to provide public agencies, other stakeholders, and interested individuals with opportunities to comment on or express concerns regarding the contents of the Draft PEIR.

1.5.5 Preparation of the Final EIR

CEQA requires the lead agency to prepare a final EIR, addressing all substantive comments received on the draft EIR, before approving a project. The final EIR must include a list of all individuals, organizations, and agencies that provided comments on the draft EIR and must

contain copies of all comments received during the public review period along with the lead agency's responses.

Written and oral comments received in response to the Draft PEIR will be addressed in a Final PEIR, which is a response-to-comments document that, together with the Draft PEIR and any related changes to the substantive discussion in the Draft PEIR, will constitute the PEIR in its entirety. In turn, the PEIR (when certified by CDFA) will inform CDFA's exercise of its discretion as a lead agency under CEQA in deciding whether to approve, approve with modifications, or deny the Proposed Program.

If CDFA chooses to approve the Proposed Program, and if significant impacts are identified in the Draft PEIR that cannot be mitigated, a statement of overriding considerations must be included in the record of program approval and mentioned in the Notice of Determination. The statement of overriding considerations would describe CDFA's reasons for approving the Proposed Program despite its significant impacts. If the Proposed Program is approved, the Notice of Determination will be filed with the California Governor's Office of Planning and Research and at the offices of the relevant county clerks (State CEQA Guidelines Section 15093[c]).

1.6 Organization of this Draft PEIR

Executive Summary. A summary of the CalCannabis Cultivation Licensing program, a description of the issues of concern, a discussion of the program alternatives, and a summary of environmental impacts are provided in this chapter.

Chapter 1, Introduction. This chapter provides an introduction to the Proposed Program, discusses the purpose and organization of the Draft PEIR and its preparation, review, and certification process.

Chapter 2, Proposed Program Description. This chapter describes the Proposed Program, including: a description of the Proposed Program location, purpose, and objectives; a summary of the proposed medical cannabis cultivation regulations and track-and-trace program required under MCRSA; a description of how the AUMA regulations would differ from those of MCRSA; activities outside the scope of the Proposed Program; and the intended uses of the PEIR.

Chapter 3, Proposed Program Activities. This chapter provides an in-depth description of the cannabis cultivation activities and techniques that are likely to be undertaken by licensees under the Proposed Program.

Chapter 4, Environmental Analysis. This chapter begins with an *Introduction to the Environmental Analysis* (Section 4.0), an introductory section containing an overview of the methodology used to assess the environmental impacts of Proposed Program. The introductory section also includes a description of the resource topics for which the Proposed Program would not have the potential for significant impacts, and which were dismissed from detailed analysis on the PEIR. The chapter then goes on to present separate sections for each resource topic carried forward for analysis, as follows:

Section 4.1, *Aesthetics*

Section 4.2, *Agriculture and Forestry Resources*
Section 4.3, *Air Quality*
Section 4.4, *Biological Resources*
Section 4.5, *Cultural Resources*
Section 4.6, *Energy Use and Greenhouse Gas Emissions*
Section 4.7, *Hazards, Hazardous Materials, and Human Health*
Section 4.8, *Hydrology and Water Quality*
Section 4.9, *Land Use and Planning*
Section 4.10, *Noise*
Section 4.11, *Public Services*
Section 4.12, *Transportation and Traffic*
Section 4.13, *Tribal Cultural Resources*
Section 4.14, *Utilities and Service Systems*

Chapter 5, Alternatives. This chapter describes the process by which alternatives to the Proposed Program were developed and screened, describes in detail the alternatives that were carried forward for full analysis in the Draft PEIR, describes the alternatives not considered in detail, presents an impact analysis and conclusions for alternatives carried forward, and identifies the environmentally superior alternative.

Chapter 6, Cumulative Considerations. This chapter describes any impacts of the Proposed Program that could combine with those of other past, present, and probable future projects to create significant cumulative impacts, and evaluates whether the Proposed Program's contribution to those cumulative impacts would be cumulatively considerable. "Cumulatively considerable" means that the incremental effects would be considerable when viewed in connection with the effects of the past, present, and probable future projects.

Chapter 7, Growth-inducing Impacts. This chapter addresses the Proposed Program's potential to induce growth, pursuant to the State CEQA Guidelines.

Chapter 8, Glossary and Acronyms. This chapter provides a glossary of key terms and a list of acronyms used in the Draft PEIR.

Chapter 9, Report Preparation. This chapter lists the individuals involved in preparing the Draft PEIR.

Chapter 10, References. This chapter provides a bibliography of printed references, websites, and personal communications used in preparing the Draft PEIR.

1.7 Submittal of Comments

The purpose of circulating the Draft PEIR is to provide agencies and interested individuals with opportunities to comment on or express concerns regarding its contents and analysis. During the public review period, CDFA will be holding public meetings, which will have the same purpose. Specific dates, times, and locations for these meetings will be provided in the NOA, on CDFA's website (calcannabis.cdfa.ca.gov), and in newspaper notices.

For those interested, written comments or questions concerning this Draft PEIR should be submitted (preferably via email in Microsoft Word format) within this review period and directed to the following:

Attention: Amber Morris
CalCannabis Cultivation Licensing Program Comments
California Department of Food and Agriculture
1220 N Street, Suite 400
Sacramento, CA 95814
Email: calcannabis.peir@cdfa.ca.gov

This CEQA document is available for review at the Proposed Program website: calcannabis.cdfa.ca.gov. In addition, hard copies can be reviewed at CDFA's offices in Sacramento, California. To arrange to view documents during business hours, call (916) 263-0801. This Draft PEIR also can be reviewed electronically at libraries throughout the state that are serving as document repositories; a full list of locations is provided on the Proposed Program website.

Written comments received in response to the Draft PEIR during the public review period will be addressed in the Response to Comments chapter of the Final PEIR. Comments submitted to CDFA, and the commentor's name, are considered public information. Contact information will be redacted, and the commentor's name can also be redacted by providing a request in the comment.

1.8 Requirements of MCRSA and AUMA Being Implemented by Other Agencies

This PEIR focuses solely on cannabis cultivation activities under the licensing authority of CDFA and development of the track-and-trace system under the CalCannabis Cultivation Licensing program. It does not address cannabis cultivation that does not require a license from CDFA (e.g., grown by individuals for personal or medical noncommercial use), nor does it address other State agency responsibilities identified in MCRSA or AUMA related to cannabis. Other licensing authorities are as follows:

- The Bureau of Marijuana Control (formerly Bureau of Medical Cannabis Control), under the California Department of Consumer Affairs, will issue licenses for distributors, dispensaries, retailers, transporters, medical cannabis testing laboratories, and adult-use microbusinesses; and

- The Office of Manufactured Cannabis Safety, under the California Department of Public Health, will issue licenses for commercial cannabis product manufacturers and testing licenses for adult-use cannabis.

Chapter 2
Proposed Program Description

2.1 Introduction

The California Department of Food and Agriculture (CDFA) is responsible for the development of regulations for the CalCannabis Cultivation Licensing program (Proposed Program), which will involve issuance of licenses for both medical and adult-use (nonmedical) cannabis cultivation licensing, as well as development of a statewide track-and-trace system.

CDFA has published proposed regulations for medical cannabis cultivation licensing and the related track-and-trace system under California Code of Regulations Title 3, Division 8, Chapter 1 and pursuant to the Medical Cannabis Regulation and Safety Act (MCRSA) (Assembly Bill [AB] 266, AB 243, and Senate Bill [SB] 643, as amended). These regulations detail a range of application and license requirements, and other related information pertinent to medical cannabis cultivation, and are available in their entirety in Appendix A, *Proposed Medical Cannabis Cultivation Licensing Regulations*.

CDFA intends to adopt emergency regulations under the Administrative Procedures Act (APA) for adult-use cannabis cultivation licensing under the Adult Use of Marijuana Act (AUMA). Emergency regulations have not yet been published; however, AUMA, like MCRSA, provides substantial detail regarding the required contents of the regulations, and CDFA has determined that it is feasible to analyze the physical impacts of cultivation under future AUMA regulations on a programmatic, first-tier level. A summary of the anticipated differences in the regulations for adult-use cultivation as compared to the proposed regulations for medical cultivation are provided in this chapter, based on the differences found in AUMA as compared to MCRSA.

Note that many aspects of the Proposed Program are prescribed by law, and CDFA's act of discretion in adopting the regulations is therefore limited to those aspects of the regulations not specifically prescribed by law and/or those which have involved CDFA's interpretation or addition of further specificity in the regulations.

At the time of publication of this Draft Program Environmental Impact Report (PEIR), the regulations discussed in this document (both the proposed regulations for medical cannabis cultivation and the anticipated emergency regulations for adult-use cannabis cultivation) are not final. They may be revised based on the California Environmental Quality Act (CEQA) and APA processes, including public comments received on the Draft PEIR and proposed medical cannabis cultivation licensing regulations.

This section (2.1) describes the Proposed Program location, purpose, and objectives. Section 2.2 provides a summary of CDFA's draft medical cannabis cultivation licensing regulations. As stated above, the exact text of the proposed regulations can be found in Appendix A, *Draft Medical Cannabis Cultivation Licensing Regulations*. Section 2.3 presents a summary of the anticipated adult-use cultivation licensing regulations, compared to the medical licensing regulations. The final sections of this chapter list activities that are outside the scope of the CalCannabis Cultivation Licensing program and describe the intended uses of this PEIR. The physical activities associated with cannabis cultivation under the Program are described in Chapter 3 of this PEIR.

2.1.1 Program Location

Cannabis cultivation can occur in a combination of urban, rural, natural, and agricultural settings in the State; therefore, Proposed Program activities occur in various locations throughout California (**Figure 2-1**). The potential geographic extent of a cultivation site depends on a number of factors, including suitable climatic and ecological conditions for the cannabis plants. Cannabis cultivation can be generally divided into three basic categories – outdoor, indoor, and mixed-light cultivation techniques. Processing of cannabis may occur as part of cultivation or as a separately licensed activity. Nurseries also involve a particular type of cultivation and are also described. A combination of these cultivation techniques may occur at one site. The location, area, and extent of specific activities under the Proposed Program ultimately would vary on a site-specific basis, considering the cultivation technique, license procured, the regulatory requirements and the management approaches available.

2.1.2 Program Purpose

The overall purpose of the Proposed Program is to establish a regulatory licensing program that would ensure that medical and adult-use cannabis cultivation operations would take place in a manner that protects the general public, cannabis cultivation workers, and the environment from the individual and cumulative effects of these operations. Licensees must also comply with all applicable laws, including the MCRSA and AUMA. An additional Program purpose is to establish a track-and-trace system to ensure that the movement of cannabis items is tracked throughout the production chain.

Horizon WATER and ENVIRONMENT

Figure 2-1
Proposed Program Area

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2.1.3 Program Objectives

The regulations are being developed to achieve the following objectives:

- Establish minimum requirements for indoor, outdoor, and mixed light commercial cannabis cultivation operations that must be achieved by cultivators in order to obtain a cultivation license from CDFA;
- Establish a license limit for the medium size cultivation categories;
- Require that individual and cumulative effects of water diversion and discharge associated with cultivation do not affect the instream flows needed for fish spawning, migration, and rearing, and the flows needed to maintain natural flow variability;
- Require that cultivation will not negatively impact springs, riparian wetlands, and aquatic habitats;
- Require that cannabis cultivation by licensees is conducted in accordance with applicable federal, state, and local laws related to land conversion, grading, electricity usage, water usage, water quality, woodland and riparian habitat protection, species protection, agricultural discharges, and similar matters;
- Establish procedures for the issuance and revocation of unique identifiers for activities associated with a cannabis cultivation license;
- Prescribe standards for the reporting of information as necessary related to unique identifiers;
- Establish a scale of application, licensing, and renewal fees, based upon the cost of administering and enforcing the Program; and
- Develop a cultivation checklist tool that can be used by CDFA, other agencies, and local governments to evaluate environmental impacts of cannabis cultivation license programs.

2.2 Summary of Draft Medical Cannabis Cultivation Regulations

2.2.1 Introduction

CDFA's proposed regulations for the cultivation of medical cannabis are broadly organized into eight distinct Articles: Article 1, Definitions; Article 2, Applications; Article 3, Cultivation License Fees and Requirements; Article 4, Cultivation Site Requirements; Article 5, Records and Reporting; Article 6, Inspections, Investigations and Audits; and Article 7, Enforcement. To assist the reader, subsections 2.2.2 through 2.2.8 have been divided using these corresponding headings and provide a summary of the regulations pertaining to each topic area. Summaries are intended to provide the reader with an overview of the regulations; for exact regulatory requirements, the reader should refer to Appendix A**,** *Draft Medical Cannabis Cultivation Licensing Regulations*.

2.2.2 Article 1, Definitions

Article 1, Definitions, defines key terms used throughout proposed Chapter 1 (California Code of Regulations Title 3, Division 8, Chapter 1). Review of the definitions section is recommended prior to review of the remainder of the regulations so as to establish a clear foundation for terminology used throughout the regulations. For example, various cannabis-specific terms, such as "batch," "strain," or "flowering," are defined for the reader for a clear understanding of usage of cannabis terminology in the context of the regulations. In addition, terms important to the way various license types are defined, such as "canopy," "immature cannabis plant," and "mature cannabis plant" are included. Finally, the following definitions are of particular importance:

- "Outdoor cultivation" means the cultivation of cannabis without the use of light deprivation and/or artificial lighting in the canopy area. Supplemental low intensity lighting is permissible only to maintain immature plants as a source for propagation.
- "Indoor cultivation" means the cultivation of cannabis within a structure using artificial light, at a rate greater than 25 watts per square foot.
- "Mixed-light cultivation" means the cultivation of cannabis using light deprivation and/or artificial lighting below a rate of 25 watts per square foot.
- "Nursery" means a licensee that produces only clones, immature plants, seeds, and other agricultural products used specifically for the planting, propagation, and cultivation of medical cannabis.

Note: Terms used in this PEIR that are not defined in the regulations are defined in Chapter 8, Glossary and Acronyms.

2.2.3 Article 2, Applications

Article 2, Applications, provides a detailed description of the application and application review process, response time frames for missing information, requirements for approval, and reasons for denial of applications. This Article details the required contents of an application, including application components, application processing fees, information that must be submitted in the license application, and additional requirements for being an owner of a licensed cannabis cultivation operation. Article 2 specifies information required from new and renewing applicants for all cultivation license types.

General requirements include the submittal of identifying information, such as addresses and contact information, for every owner and local permitting authority. All owners must provide information regarding their criminal conviction history. Among other items, applicants must identify the license type for which they are applying; provide a copy of the permit, authorization, and/or approval from the local jurisdiction; specify their type of business organization (e.g., individual, corporation, limited liability company); provide their Board of Equalization seller's permit number; provide a copy of or electronic reference to applicable CEQA compliance documents; provide proof of landownership or authorization to cultivate on said property; and submit a description of the applicant's cultivation practices. Applicants must submit a proof of a surety bond in the amount of $5,000. Applicants must also provide copies of applicable permits required by other State agencies

(e.g., California Department of Fish and Wildlife [CDFW] Section 1602 agreement or a letter from CDFW stating that no agreement is needed, evidence of permits issued by the applicable Regional Water Quality Control Board or State Water Resources Control Board (SWRCB) for water quality protection or written verification from the appropriate Board that a permit is not necessary, and information regarding the water source or sources that will be used for cultivation.

Article 2 specifies that after January 1, 2018, applicants operating in good standing with their local jurisdiction (i.e., have procured a local permit or authorization) may continue to operate without a state-issued cultivation license if CDFA receives a completed application from them no later than July 2, 2018. In addition, Article 2 specifies that CDFA will provide priority review to applicants operating in good standing with their local jurisdiction by January 1, 2016. To qualify for priority review, the applicant must provide verifying documentation issued by the local jurisdiction.

2.2.4 Article 3, Cultivation License Fees and Requirements

Article 3, Cultivation License Fees and Requirements, provides details about each of the cultivation license types being issued by CDFA, which licenses can be procured in combination, license limitations, license fees (note that license fees are separate from the application processing fees referred to in Article 2), and procedures for license issuance and license renewal. In general, cultivation licenses would be valid for 12 months from the date of issuance.

Article 3 specifies the available license types, as follows:

- "Specialty Cottage Outdoor," an outdoor cultivation site with up to 25 mature plants.
- "Specialty Cottage Indoor," an indoor cultivation site with 500 square feet or less of total canopy.
- "Specialty Cottage Mixed-Light," a mixed-light cultivation site with 2,500 square feet or less of total canopy.
- "Specialty Outdoor," an outdoor cultivation site with less than or equal to 5,000 square feet of total canopy, or up to 50 mature plants on noncontiguous plots.
- "Specialty Indoor," an indoor cultivation site with 501 to 5,000 square feet of total canopy.
- "Specialty Mixed-Light," a mixed-light cultivation site with 2,501 to 5,000 square feet of total canopy.
- "Small Outdoor," an outdoor cultivation site with 5,001 to 10,000 square feet of total canopy.
- "Small Indoor," an indoor cultivation site with 5,001 to 10,000 square feet of total canopy.
- "Small Mixed-Light," a mixed-light cultivation site with 5,001 to 10,000 square feet of total canopy.
- "Medium Outdoor," an outdoor cultivation site with 10,001 square feet to one acre of total canopy.

- "Medium Indoor," for an indoor cultivation site with 10,001 to 22,000 square feet of total canopy.
- "Medium Mixed-Light," for a mixed-light cultivation site with 10,001 to 22,000 square feet of total canopy.
- "Nursery" cultivation of cannabis solely as a nursery.
- "Processor," a site that conducts only activities associated with drying, curing, grading, trimming, storing, packaging, and labeling of nonmanufactured cannabis products.
- "Producing Dispensary" for dispensers who have no more than three licensed dispensary facilities and wish to hold either a cultivation or manufacturing license or both. Cultivation shall be limited to no more than 4 acres of total canopy.[1]

Article 3 also provides a description of the restrictions on the total number of licenses and combination of licenses that can be held by a person, including both combinations of cultivation licenses and combinations of cultivation licenses with other cannabis business licenses (**Table 2-1**). With a few exceptions, CDFA will not restrict the total number of, or combination of, cultivation licenses a person holds, provided the person does not exceed the total acreage cap of four acres established by CDFA. One notable exception to this rule is that a person may not hold multiple Medium Cultivation licenses, unless the person first holds a Producing Dispensary license issued by the Bureau of Marijuana Control (BMC, formerly Bureau of Medical Cannabis Regulation or BMCR).

Article 3 prohibits cultivation licensees from transferring or receiving cannabis or nonmanufactured cannabis products from other cultivation licensees. Cultivation licensees are permitted, however, to receive immature plants or seeds from nursery licensees or to transfer cannabis and non-manufactured cannabis to processor licensees. Cultivation licensees are not permitted to accept returns of cannabis or cannabis products.

[1] Note that the Bureau of Marijuana Control, not CDFA, issues Producing Dispensary licenses; however, Producing Dispensaries that wish to cultivate must also hold a cultivation license from CDFA.

Table 2-1. Cultivation License Limits

License Type	Limits	Regulation
Cultivation	No restrictions on number of cultivation licenses per licensee at any one time, with maximum 4 acres of total canopy	Section 8204
Medium Cultivation	Each person is limited to one Medium Outdoor, Medium Indoor, or Medium Mixed-light License, except with a Producing Dispensary license	Section 8205
Multi-Tenant Cultivation	Multiple cultivation licensees and license types may be located at the same property if each licensed premises has a unique entrance and immovable physical barriers between uniquely licensed premises.	Section 8206
License to License Movement and Commingling	Licensees, including those persons issued multiple cultivation licenses, are prohibited from commingling cannabis from other licensed cultivation premises. Cultivation licensees as defined in 8203 (a), (b), (c) or (d) [i.e., Specialty Cottage, Specialty, Small, and Medium] are prohibited from transferring or receiving any cannabis or nonmanufactured cannabis products from other cultivation licensees as defined in 8203 (a), (b), (c) or (d). These cultivation licensees are allowed to receive immature plants or seeds from nursery licensees as defined in 8203 (e) and to transfer cannabis and nonmanufactured cannabis products to processor licensees as defined in 8203 (f)	Section 8207
Vertical Integration	Cannabis cultivators in a jurisdiction that adopted a local ordinance prior to July 1, 2015 allowing businesses to cultivate, manufacture, and dispense medical cannabis may continue these activities if they have been continuously operating since January 1, 2016 and are in compliance with all local ordinances and are registered with the State Board of Equalization.	Section 8208

Source: CDFA Proposed MCRSA Regulations Sections 8205-8208.

Article 3 also outlines what cannabis business types can operate on the same property, as well as requirements for separating the premises of these licensed businesses (e.g., requirements for separate entrances and physical barriers between businesses).

2.2.5 Article 4, Cultivation Site Requirements

Article 4, Cultivation Site Requirements, provides a description of the details that an applicant must provide in their application regarding their cultivation plan. Most notably, applicants must provide a floor plan map that identifies various specific spaces (as outlined in the regulations), some of which are specific to certain license types and cultivation practices (e.g., lighting diagrams for indoor and mixed-light cultivators); a pest management

plan; the proposed water source and/or irrigation methods; a waste disposal plan; and defined propagation areas. For non-manufactured cannabis products being prepared for sale to a licensed dispensary, Article 4 also provides guidance and restrictions on the packaging and labeling of cannabis products (this guidance does not apply to products to be manufactured, redistributed, or otherwise processed prior to sale at a licensed dispensary).

Article 4 also outlines the "Standards of Cleanliness" established by CDFA to restrict the presence of pests on agricultural products. The regulations specify that "'commercially clean' means that pests are under effective control, are present only to a light degree, and that only a few of the plants in canopy or propagation area of cannabis plants or on the premises show any infestation or infection, and of these none show more than a few individuals of any insect, animal or weed pests or more than a few individual infestations of any plant disease." Article 4 provides additional details and guidance on how these standards are defined.

Article 4 also provides applicants with both general cultivation requirements (i.e., cultivation requirements applicable to multiple license types), such as guidance and restrictions on propagation and cannabis processing, and required environmental protection measures; and specific cultivation requirements (i.e., cultivation requirements specific to nursery and processor operations, and environmental protection measures specific to indoor or mixed-light cultivation).

Finally, Article 4 requires licensees to comply with the following environmental protection measures:

- Requirements related to use of water for cannabis irrigation, as outlined in Section 13149 of Water Code as enforced by the State Water Resources Control Board.
- Outdoor security lighting used shall be shielded and downward facing.
- Cultivation activities must be immediately halted if human remains are discovered; Section 7050.5 of Health and Safety Code must be implemented.
- The use of generators for cultivation is prohibited, except for temporary use in the event of a power outage or emergency.
- Compliance with pesticide laws and regulations as enforced by the Department of Pesticide Regulation. For all pesticides that comply with these laws and regulations, and are exempt from registration requirements, licensees shall comply with the following pesticide application and storage protocols:

  (1) Comply with all pesticide label directions;

  (2) Store chemicals in a secure building or shed to prevent access by wildlife;

  (3) Contain any chemical leaks and immediately clean up any spills;

  (4) Apply the minimum amount of product necessary to control the target pest;

  (5) Prevent offsite drift;

  (6) Do not apply pesticides when pollinators are present;

(7) Do not allow drift to flowering plants attractive to pollinators;

(8) Do not spray directly to surface water or allow pesticide product to drift to surface water. Spray only when wind is blowing away from surface water bodies;

(9) Do not apply pesticides when they may reach surface water or groundwater; and

(10) Only use properly labeled pesticides. If no label is available consult the Department of Pesticide Regulation.

In addition, mixed light license types of all sizes shall ensure that lights used for cultivation are shielded from sunset to sunrise to avoid nighttime glare.

Finally, indoor license types of all sizes shall ensure that electrical power used for commercial cannabis activity shall be provided by any combination of the following: (a) On-grid power with 42 percent renewable source. (b) Onsite zero net energy renewable source providing 42 percent of power. (c) Purchase of carbon offsets for any portion of power above 58 percent not from renewable sources. (d) Demonstration that the equipment to be used would be 42 percent more energy efficient than standard equipment, using 2014 as the baseline year for such standard equipment.[2] Note that CDFA intends to develop further guidance for how these requirements are to be interpreted and implemented.

2.2.6 Article 5, Records and Reporting

Article 5, Records and Reporting, outlines CDFA's requirements for recordkeeping by all participants in the licensing program. CDFA defines the term "records" to include all records, applications, reports, and other supporting documents required by CDFA. Article 5 outlines requirements for maintaining these records, including the location where they are kept, record retention periods, suitability of records to qualify for compliance evaluations, and record security. Additionally, Article 5 establishes guidelines and requirements for the track-and-trace system.

Article 5 also outlines the requirements for and provides guidance on the retention of records. Of particular note, CDFA requires that all records related to commercial cannabis activity are subject to inspection by CDFA, are available for immediate inspection by CDFA, and are legible and stored in a secured area.

[2] This requirement was developed based on the Senate Bill (SB) 32 goal of reducing statewide greenhouse gas (GHG) emissions to 40 percent below 1990 levels by December 31, 2030. The 42-percent target was developed by comparing statewide GHG emissions from 2014 (the most recent year for which the California Air Resources Board (CARB) has conducted an inventory) to 60 percent of 1990 GHG emissions. 2014 emissions were estimated at 441.5 million metric tons of carbon dioxide equivalent (MMT CO_2e), and 1990 emissions were estimated at 431 MMT CO_2e (CARB 2015, 2016). Therefore, in order to achieve a 40-percent reduction below 1990 emissions (to 258.6 MMT CO_2e) from 2014 emissions, a reduction in emissions of approximately 42 percent would be necessary statewide.

CDFA requires that all licensees maintain the following records:

- Department-issued cultivation license(s).
- Cultivation Plan.
- Records showing compliance with specified environmental protection measures.
- Supporting documentation for data or information input into the track-and-trace system.
- Financial records including bank statements, tax records, invoices and sales receipts.
- Personnel records and training records.
- Contracts with other state licensed cannabis businesses.
- Permits, licenses, and other local authorizations to conduct the licensee's commercial cannabis activity.
- Security records.
- Records associated with the composting or disposal of cannabis waste.

Article 5 also outlines CDFA's track-and-trace system, which requires unique identifiers of cannabis and cannabis products to be used by all licensees (cultivation or otherwise). Licensees are required to report the movement of immature and mature cannabis or cannabis products on the licensed premises and any movement associated with commercial cannabis activity between licensees through the track-and-trace system. This system is intended to be the primary recordkeeping and inventory system for recording all applicable commercial cannabis activities. Licensees will be required to establish a functioning account in the track-and-trace system prior to engaging in any commercial cannabis activities associated with their license and must maintain an active account while licensed. Participation requires track-and-trace system training by a designated licensee representative and may require additional training or ongoing continuing education.

Article 5 also discusses the concept of Unique Identifiers (UIDs) and CDFA's requirements for this processing. UIDs are issued by CDFA, or a designee for CDFA, for every applicable cannabis plant and cannabis product cultivated by the licensee. UIDs accompany the cannabis or cannabis product through all phases of the growing cycle. The licensee establishes a lot of immature cannabis plants and applies a UID to each established lot. Article 5 specifies that each lot of immature cannabis plants shall have not more than 100 immature cannabis plants at any one time. The licensee applies a UID to all individual plants when any plant is moved to the area designated for mature plants. Article 5 specifies other track-and-trace requirements, such as positioning of the UID, harvesting of batches, and destruction or disposal of plants.

Article 5 specifies track-and-trace user requirements, including required data and information, and responsibility for accuracy and completeness of data entered into the system. Each user of the system is required to have a unique log-on and password; user accounts may not be shared between individuals, and no individual who enters data into the system may use another individual's account. Users must monitor and resolve issues flagged by the notification system within the time designated by the notification.

This article also designates reporting requirements for the track-and-trace system. It requires users to report all transport of cannabis or cannabis products 24 hours prior to movement of such products. Report information includes license numbers, information identifying the type and amount of products, UIDs, and estimated times of departure and arrival.

Licensees are also required to use the track-and-trace system for inventory tracking activities, including reconciliation of on-premises and in-transit cannabis or non-manufactured cannabis products inventories in accordance with the time frames defined by CDFA, and (for cultivators and processors) recording the dry weight of harvested cannabis once drying and curing activities have been completed. Until July 1, 2019, this section gives a 15-day grace period for cultivators between the time the license is issued and the time a UID must be attached to each immature lot, individual mature cannabis plant, and cannabis product on the licensed premises. CDFA may perform physical inventory audits of any licensee.

2.2.7 Article 6, Inspections, Investigations and Audits

Article 6, Inspections, Investigations and Audits, provides guidance on both general and specific requirements for licensee compliance with the regulations and MCRSA. CDFA defines an inspection, investigation or audit as a review of any books, records, accounts, or on-site operations. The purposes for this review may include an on-site inspection prior to issuing a license to determine accuracy and completeness of the application, an inspection to determine compliance with license requirements, an audit of records, an investigation in response to a complaint, an inspection of incoming or outgoing shipments, or another purpose related to a licensee's activities that CDFA deems necessary. Applicants and licensees are prohibited from interfering with, obstructing, or impeding inspections, investigations, and audits.

2.2.8 Article 7, Enforcement

Article 7, Enforcement, contains the provisions under which CDFA may take a licensing or administrative action against a licensee for various violations of MCRSA or its implementing regulations. CDFA may classify a violation as "serious," "moderate," or "minor," depending on the severity of the violation. The regulations contain a table of violations and penalty ranges for each type of violation.

Disciplinary actions may include fines, suspension, revocation, or imposition of conditions on a cultivation licenses, or CDFA may order an administrative hold of cannabis or cannabis products. Fines and penalties will depend on the severity of the violation. Article 7 describes processes for issuing and adjudicating Notices of Violation, ordering an administrative hold, or conducting an informal or formal hearing.

2.3 Summary of Adult-use (Nonmedical) Cannabis Cultivation Regulations

2.3.1 Introduction

CDFA has not yet published proposed regulations related to cannabis cultivation for adult (nonmedical) use under AUMA. As provided for under AUMA, CDFA expects to issue emergency regulations in accordance with the provisions of the APA. Many of the provisions governing cannabis cultivation are the same or similar under both MCRSA and AUMA, and therefore many of the implementing regulations of these laws are anticipated to be the same or similar. Because regulations have not yet been published, this summary addresses the primary differences between MCRSA and AUMA for the licensing of cannabis cultivation.

As detailed in Section 2.2, CDFA's proposed regulations for the cultivation of medical cannabis are organized into eight distinct Articles: Article 1, Definitions; Article 2, Applications; Article 3, Cultivation License Fees and Requirements; Article 4, Cultivation Site Requirements; Article 5, Records and Reporting; Article 6, Inspections, Investigations and Audits; and Article 7, Enforcement. Sections 2.3.2 through 2.3.8 provide a summary of how the AUMA regulations are expected to differ from each article of the draft MCRSA regulations.

2.3.2 Article 1, Definitions

No substantial differences are expected in definitions for adult-use cultivation compared to the medical cultivation regulations. However, it is foreseeable that one or more defined terms may be added or removed, where they apply to distinct concepts found in one regulation but not the other.

2.3.3 Article 2, Applications

AUMA's application requirements are similar to those of MCRSA. However, several differences exist.

The first notable difference between MCRSA and AUMA concerns local permitting. Both acts require that a state licensee must comply with local licenses, permits, and/or ordinances to qualify for a license from CDFA. However, while MCRSA requires that applicants provide "a copy of the license, permit, or other authorization issued by the local agency with jurisdiction over the applicant's commercial cannabis cultivation activities," AUMA requires no such proof. Under AUMA, where the local jurisdiction does not issue a license, permit or other authorization for the commercial cannabis cultivation activity, CDFA may be the sole licensing authority.

Another difference between AUMA and MCRSA relates to the "buffer" that applicants must provide between the facility to be licensed and nearby schools. AUMA mandates a buffer of 600 feet between schools and licensed properties, similar to MCRSA, but allows licensing authorities or local agencies to specify different allowable buffer distances. "School" is

defined in AUMA as any grades between 1 and 12, day cares, and youth centers; this specific definition is not provided in MCRSA.[3]

2.3.4 Article 3, Cultivation License Fees and Requirements

Differences in licensing between AUMA and MCRSA include the types of licenses that are available under the two statutes, as well as differences in the limitations on multiple licenses and types of activities that will be licensed.

Specifically, AUMA introduces two new categories of licenses for cultivation that are not included in MCRSA. These allow licensing for large-scale growing operations and small, vertically integrated businesses (a "microbusiness").

For large-scale grows, AUMA provides for three separate large-scale cultivation licenses, as follows:

- Large outdoor cultivation using no artificial lighting, with a total canopy size greater than one acre on premises.
- Large indoor cultivation using exclusively artificial lighting, with a total canopy size greater than 22,000 square feet.
- Large mixed-light cultivation, using a combination of natural and supplemental artificial lighting at a maximum threshold to be determined by CDFA. The total canopy size on premises must be greater than 22,000 square feet.

Large-scale cultivation licenses will not be issued before January 1, 2023, and regulations for such licenses will be developed at a later date. Because of the current uncertainty regarding the activities that would be permitted under such regulations, large-scale cultivation licenses are not part of the Program evaluated in this PEIR, and further CEQA review may be required at the time such regulations are proposed.

The second new category of licenses under AUMA is a Microbusiness license. A microbusiness may cultivate cannabis in an area less than 10,000 square feet and act as a licensed distributor, Level 1 manufacturer, and retailer of commercial cannabis. Licenses for microbusinesses will be issued by BMC, although they may be required to follow applicable provisions of the cultivation regulations that will be adopted by CDFA, and CDFA may act in a review or oversight capacity over cultivation by a microbusiness. However, because the Microbusiness license would not be administered by CDFA, it is not part of the Proposed Program considered in this PEIR.

While AUMA creates new categories of licenses, as described above, it also omits certain license categories that are provided for in MCRSA. Unlike MCRSA, AUMA does not include a "specialty cottage" license for cultivation using a combination of natural and supplemental artificial light (mixed-light operation) of 2,500 square feet or less of total canopy size, up to 25 mature plants for outdoor cultivation, or 500 square feet or less of total canopy for

[3] Section 26054(b) of AUMA.

indoor cultivation, on one premises.[4] However, CDFA anticipates including this license type in the AUMA regulations. In addition, AUMA does not include a Producing Dispensary license type, although the Microbusiness license under AUMA bears similarity to a Producing Dispensary.

Also unlike MCRSA, transportation licenses are not included in AUMA. Rather, AUMA directs BMC to establish "minimum security and transportation safety requirements" for the commercial distribution and delivery of cannabis. In practice, this means that cultivators may be engaging in more transportation activities under AUMA than under MCRSA. CDFA may issue regulations mirroring or referencing the BMC requirements to cover these activities.

AUMA has different restrictions on multiple licenses than those in MCRSA. MCRSA generally limits a licensee to no more than two license categories; under AUMA, a licensee may hold state licenses in multiple categories (with certain exceptions, such as testing licensees may not hold any other licenses, and large licenses cannot hold testing, distributor, or microbusiness licenses) There is no apparent restriction on holding licenses for medical and adult-use cultivation simultaneously, although plants grown under each license will need to be kept separate and distinct from each other and will be regulated separately.

AUMA's licensing regulations will detail the fees required for various categories and types of licenses.

2.3.5 Article 4, Cultivation Site Requirements

The cultivation site requirements under AUMA are expected to be broadly similar to those for MCRSA, with a few exceptions:

Water diversion. AUMA requires CDFA to include conditions in each license as requested by CDFW and SWRCB to ensure individual and cumulative effects of water diversions and discharges from cultivation operations are addressed; MCRSA requires CDFW and SWRCB to impose such conditions, but does not require that they be incorporated into the CDFA license.[5]

Pesticide requirements. While MCRSA and AUMA are similar with respect to DPR requirements, AUMA states that DPR will develop standards and regulations applicable to licensed cultivators for the use of pesticides in cultivation and maximum tolerances for pesticides and other foreign object residue in harvested cannabis.[6]

Fire risk. Unlike MCRSA, AUMA requires each licensed cultivator to ensure that their operations do not pose an unreasonable risk of fire or combustion. Each cultivator shall ensure that all lighting, wiring, electrical and mechanical devices, or other relevant property is carefully maintained to avoid unreasonable or dangerous risk to the property or others.

[4] Section 19332(g)(4) of MCRSA
[5] Section 26060(c) of AUMA, Section 19332(d) of MCRSA.
[6] Section 19332(b) of MCRSA, Section 26060(b) of AUMA.

2.3.6 Article 5, Records and Reporting

AUMA's regulations regarding recordkeeping are expected to be substantially the same as CDFA's proposed regulations for MCRSA. Cultivation licensees who hold licenses under both MCRSA and AUMA will need to keep records related to each statute.

The track-and-trace system will be expanded by CDFA to include AUMA-related cannabis plant and product transport via an electronic seed-to-sale tracking system that includes data points for the different stages of commercial activity, including cultivation, harvesting, processing, distribution, inventory, and sale; technical stipulations apply.[7]

2.3.7 Article 6, Inspections, Investigations and Audits

The regulations under AUMA regarding inspections, investigations and audits are expected to be substantially the same as CDFA's proposed regulations for MCRSA.

2.3.8 Article 7, Enforcement

The regulations under AUMA regarding enforcement are expected to be substantially the same as CDFA's proposed regulations for MCRSA.

2.4 Activities Outside the Scope of the Proposed Program

The Proposed Program, as analyzed in this Draft PEIR, is limited to activities conducted in accordance with a CDFA license (as described in Draft PEIR Chapter 4) and does not include:

- Site development activities, including new construction or modifications to existing structures used for cultivation (with the exception that, under the proposed regulations, modifications and upgrades to electrical systems must be performed by a licensed electrician);
- Unlicensed, illegal, and/or trespass grows, including activities not in compliance with applicable laws and regulations;
- Non-commercial cannabis cultivation activities (i.e., as authorized for personal use by MCRSA for medical patients and caregivers, and by AUMA for adults over 21 years of age); and
- Activities related to cannabis that are under the licensing authority of another state agency (e.g., transportation, distribution).

These other activities are considered, as appropriate, as part of the cumulative impact analysis provided in Chapter 6, *Cumulative Considerations*, and reasoning for their inclusion or exclusion as part of the cumulative impact analysis is provided in that chapter.

[7] Section 26170 of AUMA.

2.5 Intended Uses of this PEIR

CDFA will use the PEIR to inform its decision whether to adopt and implement the Proposed Program, including the issuance of individual licenses for activities in compliance with the regulations.

In addition, this PEIR may be used by other agencies to support their issuance of permits or approvals in relationship to cannabis cultivation or other aspects of cannabis licensing, in accordance with CEQA's subsequent review and tiering provisions. These agencies may include, but are not limited to, the following:

- Cities and counties throughout California
- Bureau of Marijuana Control
- California Department of Public Health
- California Department of Pesticide Regulation
- State Water Resources Control Board
- Regional Water Quality Control Boards (all regions)
- California Department of Fish and Wildlife
- California Office of Historic Preservation
- California Air Resources Board
- California Department of Forestry and Fire Protection
- California Department of Industrial Relations, Division of Occupational Safety and Health
- California State Lands Commission
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- National Marine Fisheries Service
- California Environmental Protection Agency

Note that the purpose of this PEIR is to address environmental impacts of the Proposed Program, not to make determinations regarding legal issues that may or may not be within the jurisdiction of CDFA. As such, the PEIR does not attempt to define the jurisdictions and related permitting or regulatory approval authority of other agencies that may have oversight over cannabis cultivation activities.

Chapter 3
Proposed Program Activities

This chapter of the Program Environmental Impact Report (PEIR) describes the reasonably foreseeable cultivation activities that would be conducted by licensees for each of the license types authorized under the California Department of Food and Agriculture's (CDFA's) CalCannabis Cultivation Licensing program (Proposed Program). Information described includes both the materials and other resources that are used in cultivation, and the operational activities that are part of cultivation. Where feasible and appropriate, the discussion specifies differences between various license types.

This PEIR assumes that cultivators would continue to conduct cannabis cultivation activities in the same general manner following adoption of the Proposed Program as they have done previously, with the exception of the need to adhere to Proposed Program requirements. In addition to describing the range of activities that would be conducted under the Proposed Program, this chapter also captures, in general, the baseline conditions for existing cannabis cultivation operations.

3.1 History of Cannabis Cultivation in California

Cannabis has influenced cultures around the world. Its cultivation began as early as 10,000 B.C. in China, primarily for its strength as a fiber and then for its medicinal value. In the mid-1500s, Spaniards transported the plant to the Americas, where North American plantations grew cannabis as hemp for uses in paper, clothing, and rope (U.S. Drug Enforcement Agency Museum and Visitors Center 2016). Cannabis was brought to California between 1910 and 1920. Transported by Mexican immigrants and soldiers, "marihuana," as it was called, was vilified and even became a catalyst for anti-Mexican sentiment (Roy 2016). In 1913, California signed into law an addendum to the Poison Act of 1907, which effectively amended this act to include cannabis, outlawing possession of the plant or derivative products. The Marihuana Tax Act of 1937 lessened the federal restrictions on cannabis by allowing its use for industrial and medicinal uses. In 1970, the Controlled Substances Act was passed, which effectively repealed the Marihuana Tax Act and replaced it with a more stringent anti-drug law that banned many narcotics, including cannabis as a Schedule 1 narcotic (Roy 2016).

Proposition 215, passed in 1996, made California the first state to legalize medical marijuana. Senate Bill 420 (Medical Marijuana Program Act), which created the voluntary identification card system to identify verified medical cannabis patients, was signed into law in 2003. Governor Arnold Schwarzenegger signed Senate Bill 1449 in 2010, downgrading Senate Bill 95's penalties from a misdemeanor to an infraction for the possession of up to 1 ounce of cannabis. The Medical Cannabis Regulation and Safety Act, initially consisting of three separate bills (Assembly Bill [AB] 243 [2015], AB 266 [2015], and Senate Bill [SB] 643 [2015]) and subsequently amended, outlined a new structure for regulation and enforcement of medical cannabis production and use in California. In

November of 2016, nearly a century after its criminalization, California officially passed Proposition 64 to legalize the adult (nonmedical) use of cannabis. However, cannabis is still considered an illegal drug under federal law.

Cannabis cultivation has become a lucrative market for many growers in California, as well as for criminal organizations. The "Emerald Triangle," consisting of Humboldt, Trinity, and Mendocino Counties, is an area of extensive cultivation and may even be the top cannabis-producing region in the world (Butsic and Brenner 2016). Because of the illegal status of cannabis under state law for non-medical uses before the passage of Proposition 64 (AUMA) and the continuing illegal federal status, remote locations have been favored by cultivators for their obscurity and seclusion from law enforcement.

For outdoor and mixed-light cultivation operations, grow sites have commonly occurred on steep slopes (greater than 30 percent) within about 1,600 feet of water bodies and more than 1,600 feet from a developed road (Butsic and Brenner 2016). Elevations for these sites typically range from 2,000 to 4,000 feet above mean sea level; however, they have recently been found at elevations up to 6,000 feet, in areas highly likely to elude law enforcement (U.S. Department of the Interior 2016). Many cultivators have located their grow operations indoors because of the reduced risk of detection. Indoor grows also generate higher profit margins because controlled growing conditions typically yield higher potency cannabis (U.S. Department of Justice, National Drug Intelligence Center 2009).

Because of the clandestine nature of the cannabis cultivation business before its legalization, almost no hard data on the extent of cannabis production or volume produced is available (Kilmer et al. 2010). However, it has been estimated that California produces 60–70 percent of cannabis grown in the United States (Gabriel et al. 2013; U.S. Department of Justice, National Drug Intelligence Center 2009). In 2015, the federal Drug Enforcement Agency seized 2.4 million outdoor cultivated plants at 1,893 locations and 243,000 indoor plants at 645 locations in California (U.S. Drug Enforcement Agency 2016). According to Domestic Cannabis Eradication/Suppression Program data, cannabis cultivation and eradication levels are consistently higher in California than in any other state. The number of indoor and outdoor plants eradicated in the Golden State accounted for 66 percent of all plants eradicated nationally in 2008 (U.S. Department of Justice, National Drug Intelligence Center 2009).

3.2 Overview of Cannabis Cultivation Activities

This section provides information regarding the growing requirements for cultivating the cannabis plant, describes cannabis cultivation techniques and typical operating practices, and discusses the materials and other resource needs for cannabis cultivation under all license types described in the Medical Cannabis Regulation and Safety Act (MCRSA) and Adult Use of Marijuana Act (AUMA). Under the Proposed Program, the primary types of allowable cannabis cultivation activities would be propagation, cultivation, harvesting, and processing.

This chapter does not address aspects of cannabis commerce or cultivation that are outside of CDFA's licensing authority, such as:

- Manufacturing, distribution, testing, transportation, retail sales, and/or other activities related to cannabis commerce that would be licensed by other state agencies;
- Non-commercial cannabis cultivation for personal use as allowed under MCRSA and AUMA; and
- Site development activities for cannabis cultivation.

As discussed in Chapter 2, Section 2.4, "Activities Outside the Scope of the Proposed Program," relevant potential impacts from such other activities are addressed in the cumulative impact analysis in Chapter 6, *Cumulative Considerations.*

This chapter begins with a description of the activities common to all cultivation types, followed by descriptions of specific cultivation activities (e.g., indoor, outdoor, mixed-light).

3.3 General Operations

Cannabis cultivation begins with the selection and planting of cannabis cuttings or seeds. Where possible, male seeds are separated from female seeds or, if not identified in the seed stage, male plants would be removed later in the cultivation process, prior to becoming mature. The cuttings or seeds are typically planted in pots with either a growing medium, soil, or an inert material used in hydroponic cultivation methods. Cuttings are preferred over seeds when the cultivator wishes to guarantee the genetics of a plant and ensure the consistency of the cannabis product.

After the plants have developed their first leaves and a root system that extends through the bottom of the growth medium, the cannabis plants are transplanted or repotted to larger pots, where they continue to grow in a vegetative stage (i.e., the period of growth between germination and flowering during which the plant has no observable flowers or buds). During this stage, the plants are given water and nutrients (through compost teas, which are created by steeping compost material in water, or other amendments) and exposed to natural and/or artificial light to maintain the vegetative stage (18 hours of daylight and 6 hours of darkness). Other climate conditions (e.g., temperature, humidity, air flow) are often controlled to meet the plant's various growth needs. In addition, once the plants have a healthy root system, older leaves (identified by their pale green or yellow coloring) can be selectively removed (pruned) from the plants to improve airflow, decrease shading, increase light penetration, and allow plants to focus valuable energy on new leaves (rather than on the removed older leaves).

Pest monitoring and, if necessary, pest management activities occur throughout the cultivation period. Under the Proposed Program, such activities would be detailed in the cultivator's cultivation plan, submitted as part of the application to CDFA.

Once plants reach a desirable size, they are transitioned to the flowering phase either as a result of natural changes in the period of light (photoperiod) for outdoor cultivation or by altering the light pattern so that the plants are exposed to 12 hours of light and 12 hours of darkness (for indoor or mixed-light cultivation). In approximately 6-14 weeks, the flowers will ripen and be ready for harvesting (Marijuana Growers Headquarters 2012).

Harvesting is the next step in producing the raw cannabis material and occurs when most of the plant's trichomes[1] have changed from clear to either a light amber or cloudy white color. The primary portion of the plant that is harvested is the cannabis flowers, which are generally located at the top of the plant. Flowers are removed using a sharp pair of pruners. Since flowers at the top of the plant may be riper than those lower on the plant, harvesting of the top flowers may precede harvest of the lower flowers.

Processing of plants, which may occur at cultivation sites or at other facilities, is the final step in cultivation. Processing is described in Section3.8, "Processing Operations."

3.3.1 Typical Equipment Used

This discussion provides descriptions of the types of equipment that may be used for any type of licensed cannabis cultivation operation. For outdoor cultivation operations, much of this equipment would only be used on a limited basis to support indoor or mixed-light propagation activities that are part of the larger outdoor cultivation operation, as the equipment (e.g., lights, carbon dioxide [CO_2] generators) would not be appropriate or practical for use outdoors. Other equipment particular to one or more licensed cultivation types is described in the sections below.

Lights—Proper lighting is important in cannabis cultivation to support the plant's growth and/or flowering without causing burn, overgrowth, or nutrient deficiencies (The Weed Scene 2016). Various types of lights are used in the cultivation of cannabis as primary or supplemental lighting sources: high-intensity discharge, high-pressure sodium (HPS), light-emitting diode (LED), compact fluorescent, and induction lighting. Fluorescent lights are less efficient than HPS lights and provide less photosynthetically active radiation (Arnold 2013); therefore, fluorescent lights would primarily be used in nurseries (Grace, D., pers. comm., 2016) or in mixed-light operations where the primary light source for photosynthesis is the sun. Note that lighting may be used for propagation under any of the Proposed Program's license types, although for outdoor licenses, this is permissible only to maintain immature plants as a source for propagation.

Examples of lighting products are the Gavita Pro line, made by Gavita Holland Professional Lighting, and iGROW induction lights, made by iGROW. An example of an HPS light is the Gavita Pro 6/750E De Flex, which has a range of 400-825 watts and is used for cultivation. iGROW induction lights are typically 400-watt, full-spectrum lights (equivalent to 600- to 1,000-watt, high-intensity discharge lights) that have different bulbs for vegetative growth or blooming periods (iGROW 2016). Uses of iGROW induction lights include propagation of cuttings/seeds and primary or supplemental lighting in greenhouses. Use of lighting with a control to modify the wattage output can be useful for the modification of light intensity to suit the plants' needs.

[1] Trichomes are small resin glands protruding from the buds, leaves, and other areas on the plant. This is the only part of the plant that produces the cannabinoids (i.e., the chemical compounds in cannabis that affect neurotransmitters in the brain). There are multiple types of trichomes on a cannabis plant.

CO_2 generators—CO_2 generators can be used for enclosed operations during the vegetative growth stage of cannabis cultivation to produce additional CO_2 and enhance plant productivity and growth. They are only used during light periods when the plants would perform photosynthesis, and can raise indoor CO_2 levels by four times above natural levels. These generators are typically fueled by natural gas or propane (BOTEC Analysis Corporation 2013). This equipment also produces heat and water vapor (Marijuana Growers Headquarters 2011).

Temperature/humidity/air flow control—Equipment for temperature, humidity, and/or air flow control includes a combination of one or more of the following: ventilation fans, heating/air conditioning units, thermostat or thermometer, oscillating circulation fans, hygrometers, and dehumidifiers. A thermostat or thermometer verifies temperatures, and a thermostat controls the heating/air conditioning unit. Ventilation fans are installed within a wall of a greenhouse or building; they expel air from an indoor operation to the outside and/or pull in outside air to an indoor facility. Oscillating circulation fans improve air flow between plants and maintain uniform climate conditions within enclosed facilities. A hygrometer verifies water content in the air to determine humidity. If water content is too high, dehumidifiers can be used to decrease the water content in the air. Dehumidifiers are typically portable, self-contained units that condense water from the air into a bucket within the equipment or into a low-level drain and garden hose for continuous draining of collected water.

Pumps—Pumps may be used to transport irrigation water, nutrients, compost tea solutions, and/or pesticide solutions from a specific location (such as a water reservoir) to the location of the cannabis plants, and/or to pump groundwater from a well. In addition, pumps may be used to aerate compost teas and/or hydroponic solutions.

Containers and plant support infrastructure—Pots, trays, liners, clear plastic tray covers (humidity domes), and raised beds can be used during cannabis cultivation, depending on the needs of the individual operation. These containers may be placed on a plant dolly or plant caddy for ease of moving plants to different areas. In addition, metal shelving units can be used to store multiple cannabis plants vertically; this is particularly helpful in nursery or other propagation operations. Trellises and plastic netting can also be used to provide the plants with support as they are growing.

Watering/irrigation and water treatment equipment—In addition to the pumps described above, watering-related equipment for cannabis operations may include water storage tanks or reservoirs, hoses, polyvinyl chloride (PVC) pipes, spray nozzles, and/or drip irrigation equipment. Water treatment equipment can include chemicals, filters, or similar equipment to modify pH, treat or remove pollutants (including chlorine), and/or add materials to the water supply (e.g., nutrients).

Electrical systems and other energy sources—Energy sources for lighting and other equipment used in cannabis cultivation operations are typically provided through a connection to a local electricity provider's system or network. Wiring and other electrical equipment may be necessary to support the connection from an electrical source to the cultivation buildings and equipment. Electricity may also be generated on site (e.g., with solar panels). Under the Proposed Program, diesel- or gasoline-fueled generators can only be used for emergency backup power.

Odor Control Equipment—To counter the distinctive odor of the cannabis plant, primarily emanating from flowering plants, cultivators can use odor control equipment such as carbon filters (also known as carbon scrubbers), which contain activated carbon. The activated carbon in the filters removes odors by means of a chemical process as air is pulled through the ventilation system to outside air. While this equipment could be used for operations under all license types, it would only be used in the enclosed portions of the cultivation operation (e.g., greenhouses or other enclosures). Odor neutralizer products may also be used but are not effective for large-scale operations (GrowWeedEasy 2016, How to Marijuana 2016).

Pesticides—Pesticides and equipment to apply pesticides (e.g., backpack sprayers, tanks) may be used in cannabis cultivation. Workers may use personal protective equipment (e.g., gloves, goggles, long sleeve shirts) during application.

Transportation Vehicles—Trucks may be used to transport cannabis cultivation supplies (including soil, water, and other resources or equipment) and cannabis products to and from cultivation sites. These trucks may be operated by the cultivator or another entity. Transportation licenses are required for the transportation of medical cannabis and cannabis products, but are not required for transportation of adult-use (nonmedical) cannabis. Under the proposed regulations, medical cultivation licensees may hold a medical cannabis transporter license if they comply with the following conditions:

1. Specialty, small, and medium license types shall only transport medical cannabis from a cultivation site to a manufacturer or a distributor.

2. Nursery licensees may transport live plants to a cultivation site or a distributor.

It is important to note that, while cultivators are allowed to hold a transporter license, they must apply for it separately from their cultivation license application. The Bureau of Marijuana Control, under the California Department of Consumer Affairs, is responsible for approving transporter licenses.

3.3.2 Nutrient and Resource Requirements

Water Usage

Various factors may affect the source and volume of water used in cannabis cultivation, including, but not limited to, the cultivation method, climate and location of the cannabis cultivation site, growth stage of the cannabis plant, irrigation system design, and number and size of cannabis plants. In general, rural operations rely on water diversions from local water bodies (e.g., streams or lakes), rainwater capture, or groundwater wells as a water source. Rural sites may have on-site water tanks or reservoirs to store water for later use. Water delivery services may also be used. Cultivation operations in urban or suburban environments are more likely to be connected to a municipal water system.

Soil and Nutrients

Growth medium is used in hydroponic systems, while soil is used in containers and outdoor cultivation. Soils are often enhanced with fertilizers and soil amendments. Growth medium and/or soil amendments may include, but are not limited to, perlite, clay pellets, peat moss, vermiculite, rockwool, coconut coir, oyster shell, and flour. Fertilizers may include, but are not limited to, commercially available nitrogen, phosphorus, and potassium (NPK) blends and organic fertilizers, such as compost, feathermeal (an organic fertilizer from processed poultry feathers), and related products. Compost teas, which can be used to provide cannabis plants with microorganisms and nutrients, are prepared with materials that include compost (or a pre-mixed compost tea formula), water, tubing, an aeration pump, and a water tank to hold the tea.

3.3.3 Air Ventilation and Circulation

Cannabis plants grow best when air can flow through them; this condition helps to prevent air pockets with high moisture, which can lead to mold growth on the plants, and protects against inadequate CO_2 levels, which can hinder plant growth. In addition, inadequate air movement can result in dust and pollen on the plant's leaves, which can clog the pores (stomata) of the plant leaves that support the exchange of gases for plant growth (Growace 2013). In particular, indoor cannabis grows require adequate management of the air ventilation and circulation to minimize issues related to temperature, humidity, and CO_2 level that can occur during plant growth (420 Magazine 2008, Growace 2013). Circulating fresh air into an enclosed grow area can restore CO_2 levels and reduce the humidity and temperature. To create adequate airflow, oscillating circulation fans can be used. A description of air ventilation and circulation operations and procedures for particular cannabis cultivation methods are provided in the sections that follow.

3.3.4 Collection and Disposal of Waste Material

Plant and Soil Waste

Green waste is generated throughout the cannabis cultivation process. Some plants fail to reach maturity, pruning generates waste, nuisance weeds must be removed, and other plant material remains unused following harvesting, processing, and preparation for a new crop to be planted. Processing, including trimming, is described in Section 3.8 below.

Some cultivators may use sugar leaves,[2] branch stalks, or stems for various cannabis or hemp products; typically, however, after the flowers are harvested, the remainder of the cannabis plant becomes green waste. Removal of some large plants, particularly in outdoor cultivation operations, may require a chainsaw due to the strength and thickness of the plant's stem. Green waste is generally not piled and stored near active cannabis crops to avoid botrytis or other fungal pest issues that may occur on the waste and spread to the living cannabis plants. Disposal of green waste would follow procedures established by the Proposed Program. On-site composting is an option. If off-site disposal is used, the

[2] Small cannabis leaves that grow between the cannabis buds.

cultivator would make all cannabis waste unusable and unrecognizable before it leaves the licensed premises by grinding and mixing the green waste with non-consumable solid wastes such that the resulting mixture is at least 50 percent non-cannabis waste. Under Section 8305, Cannabis Waste Management, of the Proposed Program regulations, acceptable types of non-cannabis waste are any nonhazardous compostable materials, as defined in Title 14 of the California Code of Regulations at Section 17852(a)(11). After the waste is ground and mixed, licensees may dispose of it at a manned and permitted solid waste landfill, compostable materials handling facility, or in-vessel digestion facility as described in the regulations.

Soils used in cannabis cultivation may be treated, reused, stockpiled, and/or discarded. For reuse, soils are piled and covered with tarps for an extended period (months to a year) to allow heat from sunlight to destroy any potential soil pathogens or pests. Another practice for soil reuse is to run a compost tea through the soils between harvests to restore soil nutrients. Although it is not a direct component of the Proposed Program, another aspect of soil reuse can include laboratory testing of soil samples to identify nutrient deficiencies or other issues. Identifying such deficiencies allows the soil to be properly treated or amended with fertilizers or other soil amendments, thereby correcting these deficiencies, prior to being reused with a new cannabis crop.

Additional Solid Waste

In addition to generating green waste, cannabis cultivation operations generate solid waste from various materials and containers used during cultivation (e.g., soils, fertilizers, and pots), household trash from workers, old irrigation piping, and other equipment. Cultivators must comply with the California Integrated Waste Management Act of 1989, which requires that all California cities and counties reduce, recycle, and compost at least 50 percent of wastes by 2000.

Wastewater

Wastewater may be generated during cannabis cultivation operations from irrigation runoff, sanitary waste, or stormwater runoff. Discharges of wastewater from cannabis cultivation operations may contain sediments, chemicals, human waste, and trash (Central Valley Regional Water Quality Control Board [CVRWQCB] 2015).

In urban settings, wastewater may be discharged into the local stormwater and/or sewer system. In less developed areas, effluent may be discharged to septic systems or to on-site stormwater management systems (such as detention ponds), open ground, and, in some cases, eventually to local water bodies.

Under the Proposed Program, cultivators must comply with all applicable wastewater discharge requirements, including those established by local agencies, the State Water Resources Control Board, and the applicable regional water quality control board.

3.3.5 Storage and/or Destruction of Cannabis

Under the Proposed Program, cultivation sites would include a separate storage (holding) area, identified in the licensee's cultivation plan, for temporary holding of cannabis or

cannabis products. If CDFA issues an administrative hold on a cultivation operation, this holding area would be used while CDFA performs compliance investigations and until CDFA determines what action to take regarding those products (e.g., confiscation, destruction, distribution). Within this holding area, access would be limited and the cannabis or cannabis products subject to the administrative hold would be completely, physically segregated from other cannabis. Equipment necessary for the holding area may include the same typical equipment requirements for cultivating cannabis described above. Cannabis scheduled for destruction must be destroyed and disposed of via grinding and incorporating non-consumable solid wastes, as described in Section 3.3.4. The destruction processes may be overseen by regulators.

3.3.6 Staffing and Security

Staffing

The number of employees needed for cannabis cultivation varies based on the stage of cultivation (e.g., growing or harvesting), size of the cultivation operation, and type of cultivation operation. Worker roles generally fall into two categories: cultivators and trimmers. Cultivators are generally those who care for the plants throughout their life cycle and may be either full-time or part-time employees. Additional workers are typically needed for trimming operations that involve carefully picking cannabis buds off dried stems and trimming off unwanted material. Finally, employees may be needed to package the products for distribution/sale. Trimming and packaging operations are described in Section 3.8, "Processing Operations."

Based on data collected for all cultivation types, an average of 10 full-time and four part-time employees are employed at cultivation sites (Marijuana Business Daily 2016). Mid-sized cultivation operations (10,000-50,000 square feet) had the highest median number of full-time employees (eight) while both larger and smaller operations each had a median of three full-time employees (Marijuana Business Daily 2016). Larger sites may use more automated equipment than mid-sized grows and thus require fewer full-time employees.

Cultivators would be required to meet applicable worker safety provisions. In addition, applicants that will have 20 or more employees on payroll at any one time shall attest that they will enter into, or demonstrate that they have already entered into, and will abide by the terms of a labor peace agreement.

Security

To prevent crimes such as robbery and burglary at cannabis cultivation operations, cultivators utilize a variety of security measures to protect against unauthorized entry and theft. While not mandated by the proposed regulations, security protocols often used by cultivators include, but are not limited to, the following:

- Locating the cultivation operation in a remote area and/or an area not visible from main roads;

- Avoiding display of signs with the business name or signs that could otherwise be indicative of the cannabis cultivation activities;

- Using a security camera system to record activities within the cultivation site and immediately outside of the site;
- Using a gated fence around the property (gate access could require a key or code);
- Performing cultivation operations within an enclosed and locked building;
- Providing an alarm system for the site or the building and motion-activated lighting around the site; or
- Maintaining security personnel and/or guard dogs on site or ensuring that off-site security personnel are able to respond quickly.

3.3.7 Regulatory Requirements

As described in the Regulatory Setting portions of the various topical resource sections contained in this Draft PEIR (Sections 4.1 through 4.14), a number of state agencies have regulatory authority over some aspect of cannabis cultivation, such as the State Water Resources Control Board (water rights, water quality), the California Department of Fish and Wildlife (streambed alteration program), and the California Department of Pesticide Regulation (pesticide use and applications). In addition, local jurisdictions can adopt requirements that are more stringent than those of CDFA, including prohibitions on commercial cultivation. These requirements may restrict or otherwise affect the range of cultivation operations described above.

3.3.8 Track-and-Trace Program

To monitor cannabis products produced through the Proposed Program, licensed cultivators would be required to comply with the track-and-trace program. Under track and trace, cultivators would obtain and place unique identifier (UID) tags on each lot of immature plants (up to 100 immature plants at any one time), and each mature cannabis plant and subsequent cannabis product. Once a plant is tagged, the UID would accompany the cannabis plant or cannabis product for the duration of its existence. Cultivators would utilize CDFA's tracking system and report required information, including any movement of cannabis or cannabis products throughout the distribution chain between other licensees. Those licensees who are receiving cannabis products would also comply with the reporting requirements of the Proposed Program. Licensees would report the required information 24 hours before moving cannabis plants or products. Upon destruction of the tagged item, the UID would be retired by the track-and-trace system.

3.4 Outdoor Cultivation

Outdoor cultivation is conducted without the use of artificial lighting for plant growth, with the exception that artificial lighting is permissible to maintain immature plants as a source

for plant propagation. Cannabis can be grown outdoors in fabric pots,[3] grow bags,[4] planters, or raised beds; directly in the ground (natural soils); and in greenhouses. Cannabis strains typically used for outdoor cultivation operations are bred to require less time to reach the flowering stage (How to Marijuana 2016). Cannabis plants grown outdoors may grow to be much taller (15 feet or more) compared to those grown in mixed-light or indoor environments because indoor cultivators can control plant height by topping or training the plants and controlling the height at which the plant will flower.

3.4.1 General Operations

Outdoor cultivation typically involves planting rooted cannabis cuttings or seeds in the early spring and harvesting the plants in the fall (mid-September through November), after the plants flower. Soils used in the pots or grow bags are typically amended to ensure that nutrients are available to the plants throughout the growing season. Compost teas, which are created by steeping compost material in water, may also be used to fulfill nutrient needs (Ingham 2014). Water and nutrient supplement needs for outdoor cultivation may vary depending on the type of growing container selected. For example, raised beds typically require more watering and additional liquid nutrient application compared to other growing container options.

3.4.2 Typical Equipment Used

In addition to the equipment described in Section 3.3.1, "Typical Equipment Used," outdoor cultivation activities may also involve use of the following equipment:

Greenhouses—Greenhouses are often constructed with a frame of heavy-duty PVC or metal pipes and clear or white plastic tarp coverings. Glass may be used instead of the tarps for more established cannabis operations

Landscaping equipment—Landscaping equipment (e.g., weed whackers, mowers) may be necessary to manage vegetation growth near greenhouses. Pruning shears and/or scissors are used during cannabis trimming and/or foliage maintenance activities. Saws, including chainsaws, may be necessary to harvest large outdoor cannabis plants.

[3] Fabric pots, also known as smart pots, are made from a geotextile fabric that is very durable and allows the pots to last for approximately 5-7 years. The pots are typically black or tan. The geotextile fabric allows for increased aeration and retain less heat than regular/plastic pots or grow bags (Marijuana Growers Headquarters 2012).

[4] Grow bags are semi-perforated, flexible plastic bags. Challenges associated with use of grow bags include difficulty in moving larger bags, and they are difficult to water properly once torn (Marijuana Growers Headquarters 2012).

3.4.3 Nutrient and Resource Requirements

According to Hammon et al. (2015), water use requirements for outdoor cannabis production (25-35 inches per year)[5] are generally in line with water use for other agricultural crops, such as corn (20-25 inches per year), alfalfa (30-40 inches per year), tomatoes (15-25 inches per year), peaches (30-40 inches per year), and hops (20-30 inches per year). Lindsey (2012) similarly cites a University of California researcher who suggested that cannabis does well under irrigation management and, as a small-acreage crop, will use far less water than crops such as cotton. Estimates of daily water usage per cannabis plant range from 5 gallons (Live Science 2014) to 6-8 gallons (CDFW 2016). During field visits conducted by technical staff, two cultivators reported applying 1.4-2 gallons of water daily per plant.

In a study of cannabis cultivation in Humboldt County, outdoor cultivation operations used less water on average than greenhouse and indoor cultivation operations. Approximate water use for an outdoor cultivation site was 27,470 gallons on average annually and ranged from approximately 1,220 to 462,000 gallons annually, with the size of the operation being a major factor in this range. Annual water uses for a greenhouse operation averaged approximately 52,300 gallons and ranged from approximately 610 to 586,000 gallons annually (Butsic and Brenner 2016). During a field visit conducted by technical staff to an outdoor cultivation site, one cultivator reported using approximately 75,000 gallons for one year's entire cannabis crop (approximately 66 plants), or approximately 1,140 gallons per plant per year (slightly more than 3 gallons per plant per day).

3.4.4 Energy Demand

Outdoor cultivation utilizes natural daylight for photosynthesis, although cultivators may have use artificial lighting to maintain immature plants as a source for propagation. Outdoor cultivation operations typically start the plants indoors or in greenhouses before moving them outside during the summer months (Dutch Passion 2016). Under the Proposed Program, it is anticipated that this cultivation type would have the least lighting needs, compared to indoor, mixed-light, and nursery operations.

3.4.5 Other Considerations Specific to Outdoor Cultivation

Since outdoor cultivation is more directly affected by weather conditions compared to other types of cultivation, it is more commonly seen in certain areas of the state. The area of northwest California known as the "Emerald Triangle" consists of Humboldt, Trinity, and Mendocino Counties, and Humboldt County may be the top cannabis-producing region in the world (Butsic and Brenner 2016). This region is characterized by less urban development and extensive natural resources, including large forested areas (including redwoods and other conifers), steep terrain, and both coastal and inland areas (Butsic and

[5] Inches per year can be converted to a volume by multiplying the irrigated area by the inches. For example, 12 inches applied over an area of 10,000 square feet would be a volume of 120,000 cubic feet, or approximately 900,000 gallons.

Brenner 2016). Coastal areas in this region experience moderate temperature fluctuations while inland areas experience greater daily and seasonal temperature fluctuations.

3.5 Indoor Cultivation

Indoor cultivation is conducted within buildings without the use of any natural light. The goal of indoor cultivation is "to create an environment that maximizes the quantity and quality of marijuana flower buds produced" (Arnold 2013). High-intensity lighting is used to stimulate photosynthetic activity and plant growth, and the photoperiod is changed each day to simulate the seasonal changes in daylight that trigger various growth stages of the plant. In some cases, the intensity of light is also changed throughout a particular photoperiod to simulate the changing intensity of the sun throughout the day. Because of the controlled environment, the cultivator can accelerate the rate at which the photoperiod changes, compared to seasonal changes in the length of daylight. This causes the plant to progress more rapidly through its vegetative and flowering stages, allowing for multiple harvests over the course of the year. Up to five harvests per year can be accomplished using these methods (Cannabis Candor 2016).

3.5.1 General Operations

Considerations for cultivation of cannabis indoors include selection of a plant growth medium, ventilation, and climate control of the cultivation space. Many indoor cultivation operations also include propagation; under the Proposed Program, designated propagation areas would be identified in the licensee's cultivation plan. The site must follow and maintain nursery stock standards of cleanliness.

3.5.2 Typical Equipment Used

Using the equipment described in Section 3.3.1, "Typical Equipment Used," indoor cannabis cultivation operations create artificial climate conditions conducive to cannabis propagation, vegetative growth, flowering, and processing. Different areas within the premises may be used for each of these activities. Lighting and climate control equipment required for indoor cultivation operations includes high-intensity lighting, which requires a relatively large amount of energy (mainly electricity) for operation.

Reliance on equipment can vary widely as a result of various factors, including plant spacing, layout, and the surrounding outdoor climate. Under the Proposed Program, indoor cultivators would be required to comply with all applicable local and state regulations, including building and electrical codes.

The cannabis strains selected and the lighting availability affect the cannabis plant's growth rate and, as such, the length of time spent in each growth stage. For example, hybrid species with more *Cannabis indica* characteristics have shorter growth and flowering cycles than those with more *Cannabis sativa* characteristics (Bienenstock 2008). Additionally, providing the plants with more light during photoperiods by using reflectors, growing rooms that are painted white, and/or more intense lighting can increase the rate of plant growth indoors.

3.5.3 Nutrient and Resource Requirements

Indoor cannabis cultivation typically utilizes hydroponic systems such as agroponics. This class of hydroponics involves placing plants in an inert, sterile growth medium (e.g., perlite, clay pellets, peat moss, vermiculite, rockwool, coconut coir) and then providing all of the plants' required nutrients in a water-based mixture. The water/nutrient mixture may be applied by means of drip irrigation, the ebb-and-flow method (i.e., periodically flooding the plants' roots), or continuous flow (i.e., providing a constant flow of the nutrient mixture over the plants' roots), among other methods. The hydroponic method is sometimes preferred over traditional soils for its simplicity in measuring and controlling pH and nutrient mixtures. In addition, these systems may be less likely to host pests or diseases because the growth medium is inert. Several cannabis cultivation studies indicate that water needs for indoor cultivation activities may be much greater (approximately 40 gallons per day for a cultivation area of approximately 236 square feet) than soil-grown water applications more commonly used for outdoor or mixed-light cultivation activities (Mills 2012, BOTEC Analytical Corporation 2013).

3.5.4 Air Ventilation and Circulation

Ventilation and climate control systems are critical components of indoor cultivation operations, helping to create an environment that is healthy for cannabis plants but inhospitable to fungi. These systems are used to create optimal growing temperatures and humidity levels for the cannabis plant; minimize plant water loss during growing periods (to avoid limiting plant growth); and prevent growth of fungi, which thrive in humid environments with poor air circulation. To facilitate air circulation in sealed grow rooms or ventilated rooms where the outside air has high (greater than 50 percent) humidity, dehumidifiers can be used to remove extra moisture from the air (Marijuana Growers Headquarters 2011). Air ventilation systems that draw in outside air and expel air from the cultivation room are also useful in regulating humidity and temperature. Heating and air conditioning units can be used to control indoor cultivation area temperatures, and air conditioning can offset heat from the use of grow lamps (BOTEC Analytical Corporation 2013; Marijuana Growers Headquarters 2011).

3.5.5 Energy Demands

Based on cultivator surveys, energy demand costs comprise the largest share of production costs for indoor cultivation, although these costs vary greatly (ERA Economics 2017). One study estimated that indoor cultivation–related energy demands comprise approximately one third of the total production costs (BOTEC Analytical Corporation 2013). In another study, monthly electrical costs for indoor cultivation ranged from approximately $500 to $5,000, depending on the light requirements and the size of the operation (ERA Economics 2017). For example, an average 4,800-square-foot indoor cultivation facility, with 395 plants per production cycle yielding 5 pounds each, accumulated an average electrical cost of $14,000 per year to produce four harvest cycles (ERA Economics 2017). According to estimates by the Northwest Power and Conservation Council, one kilogram (kg) of cannabis produced indoors requires 4,000-6,000 kilowatt-hours (kWh) of energy. For comparison, 16 kWh of energy is required to produce 1 kg of aluminum, which is typically considered to be an energy-intensive product (Reitz 2015). To meet these energy demands, industry

sources recommend that indoor cannabis cultivation systems use a dedicated electrical circuit to provide versatility and allow future expansion of electrical components, reduce the risk of fire, and reduce overloaded circuits (Arnold 2013).

3.5.6 Staffing

In addition to the staffing needs described above in Section 3.3.6, "Staffing and Security," some indoor operations may have specialists on staff, such as a cultivation expert who provides guidance and oversees the growth operations, and/or a pest detection expert who monitors the plants for pests and prescribes treatment methods if pests are detected.

3.6 Mixed-Light Cultivation

Mixed-light cultivation is typically conducted within greenhouses. The photoperiod in the greenhouse is manipulated using a variety of lighting and shading techniques, including a combination of natural and artificial light, to accomplish multiple harvests per year.

3.6.1 General Operations

In mixed-light operations, the photoperiod is manipulated in a similar fashion as described for indoor cultivation to accomplish multiple harvests per year. Instead of relying solely on artificial light for photosynthesis, however, the primary light source is the sun, supplemented by artificial light. The photoperiod is altered by using tarps or other material to block out sunlight and shorten the photoperiod, and/or by using artificial light to extend the photoperiod. Either low-intensity lighting or high-intensity lighting is used. Low-intensity lighting is used to extend the photoperiod of a plant to keep it in the vegetative state and prevent flowering. High-intensity lighting can be used for this purpose or to supplement sunlight in promoting photosynthesis and growth. Mixed-light operations typically use greenhouses with shading equipment, as described for outdoor cultivation operations in Section 3.4.2. Similar to other cultivation methods, mixed-light cultivation activities may include on-site propagation from seeds or cuttings to generate their crops and must maintain nursery stock standards of cleanliness.

3.6.2 Typical Equipment Used

Equipment used for mixed-light cultivation is somewhat dependent on the type of activities performed on site (e.g., propagation). In general, equipment for mixed-light cultivation includes the same items detailed for general cultivation and outdoor cultivation activities in Sections 3.3.1 and3.4.2, respectively. Mixed-light cultivation can utilize soil or hydroponic growth systems similar to those described for indoor cultivation in Section 3.5.3.

Similar to indoor operations, mixed-light cultivation typically uses climate control and ventilation systems to create optimal growing temperatures and humidity levels for the cannabis plant, minimize plant water loss during growing periods, and prevent fungal growth.

One particular type of equipment commonly used in mixed-light cultivation is shading structures. To control light exposure, blackout tarps may be used. This type of shade fabric helps protect plants from direct sunlight, offers superior ventilation, improves light diffusion, reflects summer heat, and keeps greenhouses cooler during daytime hours (Growers Supply 2014). These tarps can be used to cover the cannabis plants (on a frame within the greenhouse but above the plants) or can be spread directly over the outside walls and roof of the greenhouse. Because the blackout tarps are used only for select periods of the day, a pulley or similar system can be helpful for moving the tarps at the beginning and end of darkness periods, and automated systems exist that shade on schedule.

Energy demands for mixed-light cultivation tend to be lower than those of indoor cultivation operations and greater than those of outdoor cultivation operations. While ventilation and low-intensity lighting are used, and in some cases heating, air conditioning, and humidity control, high-intensity grow lights are not used in mixed-light cultivation (proposed MCRSA regulations limit the lighting intensity to 25 watts per square foot) for flowering purposes.

3.7 Nursery Activities

Nurseries are defined in the proposed CDFA regulations as being a cultivation site used solely as nurseries for cannabis. Nurseries maintain plants in their vegetative stage, the period of growth between germination and flowering during which the plant has no observable flowers or buds. During this stage, plants focus on photosynthesis and accumulating resources that will be needed for flowering and reproduction (Plants in Motion 2017). While some nurseries propagate from seed, most create clones by taking cuttings from "mother plants." Nurseries may also produce seeds from mature plants.

Nursery operations may be entirely indoors or may use a combination of outdoor, indoor, and mixed-light techniques. The Proposed Program would require that nurseries licensed under the Proposed Program meet nursery cleanliness standards to minimize the establishment and spread of plant pests and diseases.

3.7.1 General Operations

The nursery cultivation process generally involves the following steps:

1. **Preparing cutting materials and growth medium** includes sterilizing the tools that are used to remove the cuttings (e.g., razor or sharp scissors) to reduce the possibility of fungi, viruses, or diseases affecting the cuttings, and presoaking the growing medium in pH-balanced water.
2. **Taking cuttings from the mother plant** involves selecting branch tips that have at least three nodes (areas where the leaves come out of an individual stem), cutting off one or two leaves at the nodes (farthest from the branch tip), and making a cut at an approximately 45-degree angle (approximately 0.25 inch below the last node). Branch tips selected typically range from 2 to 6 inches in length.
3. **Treating and planting the cuttings** may involve applying a rooting product (gel or powder) to the tip of the cutting to stimulate root growth. The cutting is then gently

placed in the growth medium (typically rockwool cubes, but possibly other media such as a mix of perlite and peat moss), and multiple cuttings are placed in a plastic tray. Some cultivators may use a layer of perlite between the tray and the growing medium to allow space for roots to grow once they emerge from the growth medium. Metal shelving units can be used to hold multiple trays at one time (Weed Farmer 2016; Marijuana Growers Headquarters 2014; Grace, pers. comm., 2016; The WeedBlog 2015).

4. **Growing the cuttings until roots are well established** involves daily adjustments to lighting, temperature, and moisture. Once all cuttings and their growth medium have been placed on a tray, the cuttings and (when used) the inside of a humidity dome are misted with water and the humidity dome is placed over the tray. To ensure ideal climate conditions for the cuttings, they are kept at a temperature range of approximately 72-80 degrees Fahrenheit (°F) and remain covered, apart from removing the humidity dome temporarily two to three times each day to mist the cuttings and allow fresh air under the dome. The cuttings are watered to prevent the growth medium from drying out. For faster root development, heating pads can be placed underneath the trays, as long as the temperatures are maintained in the ideal range. The cuttings are typically exposed to bright, but not intense, light for approximately 18-24 hours per day. Fluorescent lighting can be placed within a few inches of the cannabis plants, or more intense lighting can be used if placed farther away from the plants (2-6 feet, depending on bulb wattage) (Weed Farmer 2016; Marijuana Growers Headquarters 2014; Grace, pers. comm., 2016; The WeedBlog 2015).

5. **Preparing the rooted cuttings for transport and distribution** is the final step in the cultivation process. Once the cuttings have established roots, a quality assurance/quality control check is completed to verify the health of the plant, check for the presence of established roots, and inspect for pests. The checked final cuttings are then placed in transport containers for distribution. Nurseries typically distribute plants within two to three days of roots becoming established, although some facilities have reported holding plants for several weeks to meet client needs. Once plants are available for distribution, they are generally provided to retail dispensaries or directly to cannabis cultivators. (Weed Farmer 2016, Marijuana Growers Headquarters 2014, Pers. Comm. with Dan Grace, The WeedBlog 2015).

The total length of time between planting a cutting and distribution of a rooted cannabis plant is approximately 10 days to 3 weeks. Seed production would take a duration similar to the length of time used to cultivate for flowers, which varies based on the technique (outdoor, indoor, or mixed light).

3.7.2 Typical Equipment Used

Nurseries have similar equipment, nutrient/resource, lighting, and air ventilation/ circulation needs as the other cultivation methods. Nursery cultivation can utilize soil or hydroponic growth systems similar to indoor and mixed-light cultivation as described in Section 3.5.3. In general, nurseries utilize similar lighting procedures and techniques to indoor and mixed-light cultivation operations, but they typically use more fluorescent lights than HPS. Nurseries utilize similar air ventilation and circulation operations to those used in indoor and mixed-light cultivation operations.

3.8 Processing Operations

Processing operations consist of trimming, drying, curing, and packaging of cannabis. Once the cannabis plants are harvested, they then go through a series of processing steps to become cannabis products. Under the Proposed Program, licensees may conduct processing on the premises of the licensed cultivation site or obtain a separate processing license to perform the activities at a separate facility.

3.8.1 Trimming

Trimming involves removal of plant parts that are not useful to prepare the plants for the next step in the production process. The trimming process occurs either immediately after the harvest (wet trim) or during/after the drying process (dry trim) to remove all or most of the little (sugar) leaves that sit between the cannabis buds, along with any other unwanted leaf matter. Trimmers use small scissors appropriate for the delicate process. Buds are handled gently and touched as little as possible during the final production processes to avoid removal of cannabinoids from the plant onto anything that may touch them. Sugar leaves may be kept for use in manufactured products. Trimming techniques vary based on whether the flower is intended to be sold as is (in which case the trimming is conducted to maximize the aesthetic quality of the flower) or processed into another product (in which case the trimming is focused on other aspects of the flower, such as odor and chemical composition).

3.8.2 Drying

Following harvesting or trimming, flower buds and other cannabis products are dried and then cured. Drying methods may include hanging the flowers or branches from wire or rope lines; hanging them from mobile, self-supporting wire cages; or spreading flower buds onto screens. Screen drying is used for small buds that cannot be hung to dry; it is more labor intensive than the other methods and therefore not preferred. Drying takes place in a dark, well-ventilated environment. Removing extra leaf matter during the trimming stage allows for increased airflow around the flowers and decreased humidity in the drying rooms. Dehumidifiers can be used to lower the drying room's humidity to an optimal humidity level (below 30 percent). Drying can take approximately 5-10 days, depending on the thickness of the plant and length of the stem. At the end of the drying process, buds are clipped from the stems to a preferred size, no more than approximately 3 inches long. The removed stems are discarded and disposed of (Marijuana Growers Headquarters 2011) or used for manufacturing.

3.8.3 Curing

The final step in cannabis processing before packaging is curing, which is a slow, controlled drying of the cannabis product to allow chlorophyll in the plant to naturally degrade, enhancing the cannabinoid content and flavor of the end product. Curing involves placing the buds into uncovered plastic tubs in the drying room, rotating the buds into new uncovered tubs twice a day, covering the bins at night, and repeating this process for about 1 week until the buds are sufficiently dry.

3.8.4 Packaging and Labeling

Following curing, the cannabis buds are packaged in an airtight container or plastic bag and kept in a dark area to prevent exposure to air, light, and especially high heat, which can cause the buds to become dry and brittle. Other packaging activities may include producing pre-rolled cannabis. Under the Proposed Program, CDFA establishes packaging and labeling requirements for the distribution and transport of all nonmanufactured products produced by cultivation licensees. CDFA's packaging requirements are designed to protect the cannabis consumer by preventing contamination, as well as to protect children from accidental ingestion of the cannabis products. Both packaging and labeling are prohibited from imitating any product commonly marketed to children. Other labeling requirements include identifying the product and the product's weight, providing the UID assigned to the product through the track-and-trace system, and complying with all label size and text requirements (some of which are stipulated in Business and Professions Code Section 19347).

Specific packaging and labeling requirements for nonmanufactured medical cannabis products can be found in Section 8308 of the proposed regulations (Appendix A).

3.8.5 Other Considerations for Processing

Processing techniques also consider the end users of the plant. Because cannabinoids are produced only in the trichomes and most cannabinoids are found in these tiny resin-filled glands, these are the core material in many types of cannabis extracts and concentrates. "Kief" is a concentrate that is the resin from glandular trichomes from a cannabis plant. "Hashish" is compressed kief. Mature buds ("calyx") also have high cannabinoid content and are the other main parts to be used in cannabis products. Sugar leaves, which are smaller leaves on the flower, are typically used to make edible cannabis products after they are trimmed, dried, and cured. Pistils on the plant are the female reproductive organs and are not used for any products because they do not contain cannabinoids. With the exception of the fibers in cannabis plant stalks and the corresponding uses as hemp for fabric, rope, and oil, cannabis plant stalks are not considered a usable part of the plant. Fan leaves (the larger, well-known cannabis leaves) have low cannabinoid content and are typically disposed of during plant trimming (Kindreviews et al. 2016). However, some growers send off the remaining plant material after flower removal for manufacturing.

3.9 Magnitude of the Proposed Program

The Standardized Regulatory Impact Assessment (SRIA) prepared for the Medical Cannabis Cultivation Program (an earlier version of the CalCannabis Cultivation Licensing program) (ERA Economics 2017) estimates that cannabis production in California in 2016 was approximately 13.5 million pounds, consisting of 650,000 pounds of medical cannabis, 1.85 million pounds of cultivation for in-state nonmedical use, and 11 million pounds of cultivation for export outside of the state. The estimated breakdown by region is shown in **Table 3-1** and depicted in **Figure 3-1**.

Table 3-1. California Cannabis Production by Region, 2016

Area	Total Production (pounds)
Bay Area	175,000
North Coast	4,150,000
Southeast Interior	300,000
North San Joaquin	275,000
Central Coast	1,350,000
Intermountain	3,875,000
South San Joaquin	1,750,000
South Coast	625,000
Sacramento Valley	1,000,000
State Total	**13,500,000**

Notes: All numbers rounded.

Source: ERA Economics 2017

The SRIA estimates that the current statewide distribution of production technology is 60 percent outdoor, 24 percent mixed-light, and 16 percent indoor cultivation. Based on anecdotal feedback from surveys, it is likely that cannabis has a smaller share from outdoor cultivation, but no data are available to support this assertion (ERA Economics 2017). **Table 3-2** shows the share of each production technology by region.

Table 3-2. Estimated Share of Production Technology by Region

Region	Indoor	Outdoor	Mixed Light
Bay Area	61%	26%	13%
North Coast	6%	51%	43%
Southeast Interior	8%	83%	8%
North San Joaquin	17%	74%	9%
Central Coast	6%	74%	20%
Intermountain	9%	63%	27%
South San Joaquin	3%	43%	54%
South Coast	30%	48%	22%
Sacramento Valley	8%	77%	15%
Total	**16%**	**60%**	**24%**

Source: ERA Economics 2017

NOTE: Cannabis quantities indicated correspond to the total amount produced by a particular region. Counties within a particular region are distinguished by matching fill colors.

Source: SRIA 2017

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Figure 3-1. Map of Estimated California Production (Pounds) by Region

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The SRIA estimates that under MCRSA and AUMA, overall production would remain generally unchanged. Licensed medical in-state consumption would decrease from 650,000 pounds to 250,000 pounds. Licensed adult-use consumption, a new, previously nonexistent market, would be 1 million pounds. Unlicensed in-state consumption would decrease from 1.85 million pounds to 1.25 million pounds. The SRIA predicts a slight shift from outdoor and mixed-light production to indoor production. The SRIA timeframe for these changes is 2018.

The total number of medical cultivation licenses anticipated to be issued under the Proposed Program ranges from 500 to 2,500 (ERA Economics 2017). The number of adult-use licenses has not yet been estimated. Note that the proposed regulations limit the number of medium-sized cultivation licenses to one per person.

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Chapter 4
Environmental Analysis

4.0 Introduction to the Environmental Analysis

This section provides introductory information related to the evaluation of environmental impacts associated with the California Department of Food and Agriculture's (CDFA's) CalCannabis Cultivation Licensing program (Proposed Program). It describes the overall approach to the impact analyses, including key terminology and a description of how the significance of environmental impacts is evaluated. It also discusses resource topics eliminated from detailed analysis in the Draft Program Environmental Impact Report (PEIR).

4.0.1 Introduction to the Resource Sections

Fourteen topical sections are presented that describe the environmental resources and potential environmental impacts of the Proposed Program. Each section (Sections 4.1 through 4.14) contains the following information about its resource topic:

- A description of the regulatory setting related to the resource topic;
- A description of the environmental setting and background information related to the resource topic, to help the reader understand the resources that could be affected by the Proposed Program;
- A discussion of the thresholds used in determining the significance of the Proposed Program's potential environmental impacts;
- A discussion of the potential environmental impacts of the Proposed Program on the resource, including the significance of each potential impact; and
- A description of the regulatory requirements of CDFA and others and, where appropriate, additional mitigation measures to be adopted by CDFA that would avoid or minimize impacts.

4.0.2 Significance of Environmental Impacts

The California Environmental Quality Act (CEQA) requires that an EIR define a threshold of significance for each impact that may occur on the physical environment. A threshold of significance, or significance criterion, is an identifiable quantity, quality, or performance level of a particular environmental effect. In general, potential impacts are identified as either potentially significant or significant (above threshold) or less than significant (below threshold).

Under CEQA, impacts of a proposed project or program are assessed relative to the environmental baseline, which is defined as the existing physical conditions in the affected area as they existed at the time the Notice of Preparation was published (State CEQA Guidelines Section 15126.2[a]) (see Section 4.0.3, below, for a discussion of the environmental baseline as it relates to the analysis in this PEIR). Impacts of a proposed project or program are limited to changes in the baseline physical conditions of the

environment (State CEQA Guidelines Section 15125[a]) that would result directly, indirectly, or cumulatively from the proposed project or program. CEQA does not require the lead agency to consider impacts that are speculative (State CEQA Guidelines Section 15145).

For the purposes of this PEIR, significance criteria are drawn from the State CEQA Guidelines, Appendix G: Environmental Checklist Form. Each environmental resource topic is evaluated in a separate section in this chapter. Each section contains impact statements that identify the mechanism of impact of a specific Proposed Program activity on a specific environmental attribute. Each impact statement is tied to one or more significance criteria. Each impact statement is followed by an analysis that characterizes the potential physical change as a result of Proposed Program activities compared to the environmental baseline, relative to one or more significance criteria.

4.0.3 Environmental Baseline of Analysis

Many of the cultivation activities that would be regulated under the Proposed Program are already ongoing. The impact analysis presented in this PEIR considers these ongoing activities to be a part of the baseline environmental conditions. This baseline includes existing cultivation operations that are not operating in accordance with existing State law or local requirements, including those that may become licensed under the Proposed Program.

The impact analysis therefore focuses on the increment of change that would result from implementation of the licensing program, considering both ongoing and new cultivation operations, including the adjustment of some ongoing cultivation activities to the new regulatory requirements. For example, an existing cultivator that exceeds the size limits of the Proposed Program would need to reduce the size of its operation to obtain a license. Similarly, mixed-light cultivators may need to adjust their light intensity if it exceeds the Proposed Program's limits (or else be classified as indoor cultivation). Others may choose to continue their operations but not seek a license under the Proposed Program (and be subject to enforcement action), or cease operations altogether.

In general, the shifts that would occur as cultivators come into compliance with the Proposed Program would have a beneficial impact on many environmental factors, given the environmentally protective standards of the Proposed Program and the monitoring and enforcement efforts that would be conducted related to the Proposed Program. This comparison against the baseline, wherein many cultivation operations need not and do not comply with such environmentally protective standards, is a core premise of the impact evaluation in the PEIR.

The meaning of this baseline may vary by resource topic, depending on the type of impact—ranging from a "zero" baseline to a "zero" impact. For instance, existing cannabis cultivation that generates noise under baseline conditions, and such noise generation would continue under the Proposed Program, may therefore result in zero impact. Noise from cannabis cultivation operations, however, would also occur in new cultivation locations. In those new locations, the baseline level of noise from cannabis cultivation would be zero and there may be a greater impact.

On the other end of the spectrum, emissions of criteria air pollutants are considered at the scale of the air basin as a whole. To the extent that emissions from cultivation remain

unchanged in that air basin, the Proposed Program would have no incremental impact, regardless of whether the cultivation operations are new or ongoing.

The relevance of the baseline to each impact topic is further described within the impact discussions for each topic.

4.0.4 Focus on Activities Subject to CDFA's Regulatory Authority

The adoption of regulations, in and of itself, does not have the potential for significant impacts on the environment. Rather, it is the cultivation activities that would occur under the regulations that have the potential for impacts. Therefore, the impact analysis focuses on the cultivation activities licensed under the Proposed Program (as described in Chapter 3, *Proposed Program Activities*), as they would be implemented considering the requirements of the Proposed Program (as described in Chapter 2, *Proposed Program Description*).

In addition, the impact analysis focuses specifically on the activity subject to CDFA's regulatory authority—cannabis cultivation, processing, and administration of the track-and-trace system.

It also bears noting that many aspects of the Proposed Program are prescribed by law. CDFA's discretion in regulating cultivation activities is therefore limited to those items not specifically prescribed by law and/or those that have involved CDFA's interpretation or addition of further specificity in the regulations.

Consideration of Activities Related to Cannabis Cultivation

In particular, the analysis of direct and indirect impacts contained in this Draft PEIR focuses on the operational activities associated with licensed cultivation as authorized under the Proposed Program. Additionally, the consideration of other related impacts, such as those associated with ancillary activities supporting cannabis cultivation, are considered in the cumulative impact analysis contained in Chapter 6, *Cumulative Considerations,* and more general conclusions are made regarding the likelihood and type of these impacts. Such ancillary activities may include but not be limited to site development for the purposes of cultivation, and other activities related to cannabis cultivation (e.g., construction of roads, stream crossings, clearing of vegetation, well or septic system development, development of homes located at cultivation sites). CDFA does not have discretionary authority over these ancillary activities, and therefore they are not considered to be part of the Proposed Program. While in some cases these activities are related to cannabis cultivation (e.g., site development for the purposes of cultivation), such activities are not necessarily undertaken for the purposes of cultivation (e.g., construction of a greenhouse, which eventually is used for cannabis cultivation). In many instances, site development may have been completed prior to the establishment of the Proposed Program (in which case it is part of the baseline condition). Ultimately, such developments may be used for other purposes (e.g., use of a greenhouse for cultivation of other crops).

Furthermore, the characteristics of such development activities are expected to vary based on site-specific conditions; in a statewide PEIR, it would not be feasible—and in many cases would be speculative—to predict and consider every such circumstance and the extent to which it is directly linked to the cultivation operation. Finally, it bears noting that site

development activities would generally be subject to authority of local jurisdictions, and in some cases, approvals from other state agencies.

As a result, site development is considered to have potential independent utility from the cultivation activities that would be licensed under the Proposed Program and is not considered as part of the Proposed Program. That said, to ensure full disclosure of potential impacts, these separate and potentially related activities are considered as other past, present, or probable future projects whose impacts could combine with those of the Proposed Program to create cumulative impacts; they are discussed in Chapter 6, *Cumulative Considerations*.

4.0.5 Focus on Licensed Cultivation Activities

The analysis of the Proposed Program focuses on cultivation activities conducted in accordance with a license issued by CDFA. Operations that do not obtain a license after (and if) CDFA approves and implements the Proposed Program would not be part of the Proposed Program. For example, the impact analysis excludes operations that would be unlawful under both the baseline and the Proposed Program (for instance, cultivation on public land and cultivation for export outside of the state). However, the impacts of such unlicensed cultivation activities, which are expected to continue after (and if) CDFA implements the Proposed Program, are considered as part of the cumulative impact analysis in Chapter 6, *Cumulative Considerations*. As described above under Section 4.0.3, an anticipated direct impact of the Proposed Program is a reduction in the number of existing unlicensed activities. To the extent that cultivators at existing unlicensed cultivation sites would modify their operations to comply with the Proposed Program, those cultivators' existing operations are considered as part of the baseline, and the impacts that would be caused by modifying their operations to comply with the Proposed Program would generally be beneficial.

The analysis also assumes that licensed cultivators would generally operate in accordance with applicable state and local regulations and other legal requirements (including those of the Proposed Program). CDFA acknowledges that some cultivators who have obtained licenses may not operate in strict compliance with applicable regulations and requirements, either knowingly or unknowingly. However, for the purposes of the impact analysis, the Draft PEIR does not speculate on the extent or nature of such noncompliance. Instead, the analysis assumes that noncompliance would not be sufficiently widespread, systematic, or otherwise of a nature that would meaningfully change the impact conclusions related to the Proposed Program. These assumptions are supported by the fact that, relative to baseline conditions, CDFA and other state and local entities would conduct more inspections and enforcement actions under the Proposed Program to ensure the compliance of licensed cultivators with applicable State and local regulations and other legal requirements (including those of the Proposed Program).

Terminology Used in this PEIR to Describe the Legal Status of Cultivation Operations

The complex regulatory environment surrounding the legality of past, existing, and future cannabis cultivation in California requires careful definition of the terminology used in this PEIR. Accordingly, this PEIR uses the following terminology regarding this topic:

- Federal compliance: Cannabis is classified as a Schedule 1 controlled substance under the federal Controlled Substances Act of 1970. Individuals engaging in cannabis cultivation and other cannabis-related activities are in violation of federal law and risk of federal prosecution. Therefore, no terminology has been established relative to federal compliance, since all cannabis cultivation is illegal under federal law.
- State compliance:
  - Past or existing cultivation: Facilities that were or are being operated in compliance with State law under the requirements of Proposition 215, the Compassionate Use Act of 1996 (described in Chapter 3, *Proposed Program Activities*), and other State cannabis-related laws are described as "**Prop. 215 compliant**." Facilities not in compliance are termed "**illegal**."
  - Future cultivation following approval of the Proposed Program: Facilities that have sought or obtained a license from CalCannabis Cultivation Licensing and are complying with the requirements of the Proposed Program are termed "**licensed**." Other facilities are termed "**unlicensed**."
- Local compliance: Facilities operating in compliance with local jurisdiction requirements related to cannabis cultivation are termed "**permitted**." Other facilities are termed "**unpermitted**."

On this basis, several types of cultivation operations exist:

- Past or present cultivation activities (i.e., those associated with the environmental baseline and/or cumulative setting):
  - Prop. 215 compliant and permitted: activities conducted in compliance with State law and local requirements
  - Prop. 215 compliant and unpermitted: activities conducted in compliance with State law but not in compliance with local requirements
  - Illegal and permitted: activities not in compliance with State law but in compliance with local requirements
  - Illegal and unpermitted: activities not in compliance with State law or local requirements
- Future cultivation activities (i.e., those conducted following implementation of the Proposed Program):
  - Licensed and permitted: activities conducted in compliance with CalCannabis Cultivation Licensing requirements and local requirements
  - Licensed and unpermitted: activities conducted in compliance with CalCannabis Cultivation Licensing requirements, but not in compliance with local requirements
  - Unlicensed and permitted: activities not in compliance with CalCannabis Cultivation Licensing requirements, but in compliance with local requirements
  - Unlicensed and unpermitted: activities not in compliance with either CalCannabis Cultivation Licensing requirements or local requirements

4.0.6 Reliance on Existing Regulatory Requirements

Reliance on Existing State Laws and Regulations

Each resource section includes a regulatory setting discussion related to the individual resource topic. This regulatory background, in many cases, includes one or more State agencies with jurisdiction over the resources that may be affected by cannabis cultivation. Both MCRSA and AUMA require that licensees comply with all applicable local and State laws, regulations, ordinances and permits. To the extent that such laws and regulatory requirements adequately address potential adverse environmental effects, the environmental analysis discloses this information, on a programmatic level, in the regulatory setting and describes the manner in which regulatory requirements (aside from the Proposed Program) would ensure that the impact would not be significant under CEQA. Examples of relevant existing laws and regulatory requirements include local zoning and building code standards, requirements of the California Department of Industrial Relations, Division of Occupational Safety and Health, and State requirements related to hazardous materials transportation, use, storage, and disposal. Additionally, some State agencies (e.g., State Water Resources Control Board [SWRCB], California Department of Fish and Wildlife [CDFW], California Department of Pesticide Regulation) are developing guidance regarding the manner in which these agencies apply their regulatory authority to cannabis cultivation. Several other regional agencies (e.g., the North Coast Regional Water Quality Control Board [RWQCB] and Central Valley RWQCB) have already developed regulatory programs specific to cannabis cultivation that predate MCRSA and AUMA. Some of these other State agencies may also tier and/or in some way rely on this PEIR, as they exercise their own regulatory authority on a project-specific basis or otherwise.

Reliance on Local Regulation

Local governments have various standards and approval processes that apply to cannabis cultivation. Some cities and counties have adopted, or are considering adopting, commercial cannabis cultivation ordinances (refer to **Appendix E** for summaries of many of these ordinances). MCRSA and AUMA require local standards to be at least as protective as those of the Proposed Program. It bears noting that under AUMA, local jurisdictions are not required to approve commercial cannabis cultivation. In any case, where applicable, local ordinances are identified in the PEIR and analyzed as part of the environmental impact analysis.

Regardless of whether local governments have developed standards and approval processes specific to commercial cannabis cultivation, many other local requirements would apply to commercial cannabis cultivation (e.g., general plan policies, zoning ordinances, noise standards). Furthermore, consistent with MCRSA, AUMA, the State's zoning and planning laws, and other laws that establish the police power and regulatory authority of local jurisdictions, CDFA has determined that some topics fall outside of CDFA's regulatory authority because they are regulated by local land use authorities at the project-specific level. Indeed, MCRSA explicitly states that it does not supersede or limit existing local authority for law enforcement activity; enforcement of local zoning requirements or local ordinances; or enforcement of local license, permit, or other authorization requirements. Similarly, AUMA is explicit in not superseding or limiting the authority of a local jurisdiction to adopt and enforce local ordinances to regulate licensed commercial cannabis businesses, including, but not limited to, local zoning and land use requirements and business license requirements. Topics delegated to local land use authorities include issues such as aesthetics, land use and

planning, noise, odors, compliance with building standards, provisions for police and fire protection, and connections to public utilities (e.g., public water, wastewater, and storm drainage systems). For these topics, determination of potential impacts is most appropriately evaluated at a local (and in some cases, site-specific) level, and the development of statewide requirements to comprehensively address such impacts falls outside of CDFA's jurisdiction, nor would it be practical and feasible to do so.

The extent to which the regulatory authority and regulatory programs of local jurisdictions are expected to ensure that the impacts of licensed commercial cannabis cultivation would not be significant is identified in the impact discussions contained in Sections 4.1 through 4.14.

Compliance with Federal Laws and Regulations

Each resource chapter includes a federal regulatory setting related to the individual resource topic. Because cannabis cultivation is not authorized under federal law, it may not be possible for certain applicants to be in strict compliance with federal requirements, given that a federal agency is prohibited from issuing a permit or approval for an operation that is in violation of federal law. As a result, federal requirements that would normally address impacts (e.g., the requirements of the U.S. Fish and Wildlife Service or National Marine Fisheries Service included with an incidental take authorization under the federal Endangered Species Act) cannot be relied upon. This circumstance has been acknowledged and considered in the environmental analysis.

4.0.7 Consideration of Proposed Program Regulatory Requirements

Impact discussions first consider the potential for a significant impact from cultivation activities in light of the considerations provided above; the analysis then considers the requirements of the Proposed Program that may reduce or avoid any potentially significant impacts. A final significance conclusion is then made, based on compliance with Proposed Program requirements, and mitigation measures where warranted and feasible.

4.0.8 Site-Specific Analysis and Future Tiering

In many cases, insufficient data were found during preparation of the PEIR to support the evaluation of potential impacts relative to baseline conditions. In other cases, the potential for impacts would be based on site-specific conditions, the details of which would be infeasible to identify and evaluate in a statewide PEIR, and the characteristics of which may be currently unknown (e.g., the locations of new cultivation sites that would be planned and licensed in the future). In these cases, rather than speculate on the impacts of implementation actions and their significance, the PEIR makes more general conclusions regarding the likelihood and types of impacts caused by cannabis cultivation, including the cumulative impacts that would be expected under the Proposed Program.

Furthermore, many local jurisdictions have conducted, or will conduct, CEQA compliance as part of the process of adopting commercial cannabis cultivation ordinances. In some cases, in addition to or in lieu of conducting CEQA analysis on their ordinances, local jurisdictions may conduct CEQA compliance for individual cultivation operations. These CEQA compliance documents would generally be expected to address any site-specific impacts of cannabis

cultivation that have not been individually considered in this PEIR. The same is true of further project-specific review by various state agencies as they exercise their own regulatory authority over individual cultivation operations.

Therefore, the site-specific impacts of licensing particular cultivation operations would be addressed, to the extent needed, in tiered CEQA analysis conducted at a more local, site-specific, level. This may be done by a local jurisdiction as the lead agency, or by another agency with discretion over the activity (such as CDFA, CDFW, SWRCB, or a RWQCB). This tiered analysis would need to be completed prior to issuance of a license for a cultivation operation that may have a significant impact on the environment in a way not addressed by the PEIR. As such, all significant impacts would be disclosed before final approval of the cultivation activity that may result in such impacts, which would ensure full compliance with CEQA. Section 1.4.1 of this Draft PEIR provides further description of how CDFA intends to address site-specific CEQA compliance.

4.0.9 Impact Terminology

This PEIR uses the following terminology to describe statewide environmental effects of the Proposed Program:

- A finding of ***no impact*** is made when the analysis concludes that the Proposed Program would not affect a particular environmental resource or issue.
- A potential impact is considered ***less than significant*** if the analysis concludes that the Proposed Program would not result in a substantial adverse change in the environment, and no mitigation is needed.
- A potential impact is considered ***significant*** or ***potentially significant*** if the analysis concludes that the Proposed Program would or could result in a substantial adverse effect on the environment.
- A potential impact is considered ***significant and unavoidable*** if the analysis concludes that the Proposed Program could result in a substantial adverse effect on the environment, and the impact would remain significant after application of all feasible mitigation measures.
- A potential impact is considered ***beneficial*** if the analysis concludes that the Proposed Program would result in an improvement in the quality of the environment.
- A ***substantial adverse change*** in the environment would be a change resulting from the Proposed Program that was greater than the established threshold of significance for each potential impact.
- ***Mitigation*** refers to specific measures or activities that CDFA would require licensees to implement to avoid, minimize, rectify, reduce, eliminate, and/or compensate for a significant or potentially significant impact resulting from the Proposed Program.
- A ***cumulative impact*** can result when a change in the environment results from the incremental impact of the Proposed Program when added to similar impacts of other related past, present, and probable future projects or programs. Significant cumulative impacts may result from individually minor but collectively significant interactions among projects. The cumulative impact analysis in this PEIR focuses on whether the Proposed Program's incremental contribution to identified cumulatively

significant impacts caused by past, present, or probable future projects (including the past, present, and future statewide Program activities) is considerable (i.e., significant).

4.0.10 Sections Eliminated from Further Analysis

The following environmental resource areas have been eliminated from further analysis in this PEIR because little or no potential exists for these activities to have a physical effect on the specified resources, based on the nature and scope of Proposed Program activities.

Geology, Soils, and Seismicity

The Proposed Program would not include construction of structures that could be subject to earthquake-related hazards, unstable soils, expansive soils, or other geotechnical hazards, and it would not entail construction of septic or other wastewater disposal systems. Thus, the Proposed Program would not expose individuals to increased geological or seismic hazards, would not construct structures on unstable soils, and would not create wastewater systems in unsuitable soils. Therefore, the Proposed Program's effects on geologic resources would not have the potential to be significant, either at a program level or cumulatively.

The extent to which the Proposed Program could disturb soils and cause erosion of topsoil is discussed in Section 4.8, *Hydrology and Water Quality*.

Mineral Resources

The Proposed Program would not include any activities that would have the potential to affect mineral production sites. The Surface Mining and Reclamation Act requires that local jurisdictions enact planning procedures to guide mineral conservation and extraction at particular sites and to incorporate mineral resource management policies into their general plans. On this basis, it is presumed that counties would, as needed and as applicable, encourage the conservation (i.e., protection from incompatible land uses) of areas designated as having substantial potential for mineral extraction and discourage development that would substantially preclude the future development of mining facilities in these areas. The potential for the extraction of substantial mineral resources from lands classified by the State as areas that contain mineral resources (Mineral Resource Zone [MRZ]-3) would be considered by counties at a local level when making land use decisions. For these reasons, no significant impacts are anticipated related to the availability or use of a known, valuable mineral resource, either at a program level or cumulatively.

Population and Housing

As described in the Standardized Regulatory Impact Assessment prepared for the Proposed Program (ERA Economics 2017), the Proposed Program is not anticipated to change the overall extent of cannabis cultivation in the state and, therefore, would not create a substantial number of new jobs that could induce population growth. The Proposed Program also does not include construction of new housing or displace existing housing, and would not result in construction of infrastructure or include other activities that could indirectly induce or remove an obstacle to population growth. Therefore, the Proposed Program would have no potential to cause adverse effects related to population growth or housing demand. No impact would occur on population and housing, either at a program level or cumulatively.

Recreation

Under the Proposed Program, cultivation would not be allowed on public lands that may be used for recreation. Although some licensed cultivation sites may be located near recreational areas, the Proposed Program would not include any actions (or cause population growth) that would affect the availability or use of recreation sites. As such, it would not have any potential to cause or accelerate physical deterioration of recreational facilities, or include or require construction or expansion of such facilities. No impact would occur on recreation, either at a program level or cumulatively.

4.1 Aesthetics

4.1.1 Introduction

This section of the Program Environmental Impact Report (PEIR) presents the environmental setting and potential impacts of the California Department of Food and Agriculture's (CDFA's) CalCannabis Cultivation Licensing program (Proposed Program) related to aesthetics (visual resources). Potential impacts on scenic resources, public views of scenic vistas, visual character of potentially affected areas, and nighttime views from Proposed Program activities are evaluated.

This section focuses on visual effects associated with cannabis cultivation operations at existing and/or new facilities, considering the cultivation techniques and facilities and equipment used in cannabis cultivation.

Information regarding aesthetics presented in this section is primarily based on the following sources:

- Relevant state, regional, and local rules, regulations, and requirements;
- Site visits to various growing operations, including outdoor, indoor, mixed-light, and nursery cultivation facilities, and consultation with cannabis cultivators and other cannabis cultivation experts; and
- Web-based research on cannabis cultivation and associated topics, including online newspaper and magazine articles.

4.1.2 Terminology

The term *aesthetics* refers to visual resources, the quality of what can be seen, and the overall visual perception of the environment, and may include such characteristics as building scale and mass, design character, and landscaping. Aesthetic impacts are analyzed through an examination of views and/or viewsheds. *Views* refer to visual access to and/or obstruction of prominent visual features, including specific visual landmarks and panoramic vistas. *Viewsheds* refer to the visual qualities of a geographic area. The geographic area is defined by the horizon, topography, and other natural features that give an area visual boundary and context. Viewshed impacts are typically characterized by the loss and/or obstruction of existing scenic vistas or other major views in the area of the project site that are available to the general public.

Visual character, visual quality, and visual sensitivity are three terms used throughout this section. *Visual character* is the unique set of landscape features that combine to make a view, including native landforms, water, vegetation patterns, and built features (e.g., buildings, roads, and other structures). *Visual quality* is the intrinsic appeal of a landscape or scene resulting from the combination of natural and built features in the landscape. Natural and built features combine to form unique perspectives with varying degrees of visual quality. *Visual sensitivity* reflects the level of interest or concern that viewers and responsible land management agencies have for a particular visual resource with visual

quality taken into account. Thus, visual sensitivity is a measure of how noticeable proposed changes might be in a particular setting and is determined based on the distance from a viewer, the contrast of the proposed changes, and the duration that a particular view would be available to viewers. For example, areas such as scenic vistas, parks, trails, and scenic roadways typically have a high visual quality and visual sensitivity because these locales are publicly protected, appear natural, typically have long view durations, and have more commonly available close-up views. *Sensitive viewers* are individuals or groups that are particularly affected by changes to the aesthetics of the surrounding area.

4.1.3 Regulatory Setting

Federal Laws, Regulations, and Programs

National Scenic Byways Program

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) established the National Scenic Byways Program, implemented by the Federal Highway Administration (FHWA). Under the National Scenic Byways Program (23 U.S. Code [USC] Section 162) a roadway can be designated as a State Scenic Byway, a National Scenic Byway, or an All-American Road based upon intrinsic scenic, historic, recreational, cultural, archaeological, or natural qualities. A road must exemplify the criteria for at least one of these six intrinsic qualities to be designated a National Scenic Byway. For the All-American Roads designation, criteria must be met for a minimum of two intrinsic qualities. The jurisdiction of the municipal, county, state, Tribal, or federal governments that govern the designated highway and the lands adjacent to it remains unchanged. The byway's intrinsic qualities are typically protected by those jurisdictions. The following designated Scenic Byways are located in California: Arroyo Seco Historic Parkway (Route 110), Death Valley Scenic Byway, Ebbetts Pass Scenic Byway, Route 1 – Big Sur Coast Highway, Route 1 – San Luis Obispo North Coast Byway, Tioga Road/Big Oak Flat Road, and Volcanic Legacy Scenic Byway (FHWA 2015, 2016).

Wild and Scenic Rivers Act

The Wild and Scenic Rivers Act of 1968 was enacted to protect "certain selected rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural or other similar values, shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations" (Section 1(b) of the Wild and Scenic Rivers Act [16 USC Sections 1271-1287], Public Law 90-542) (FHWA 2015). Protected rivers are designated as wild, scenic, or recreational rivers; segments of a given river may be designated with one or all of these classifications. California has approximately 189,454 miles of river, of which 1,999.6 miles are designated as wild & scenic—1 percent of the State's river miles (National Wild and Scenic Rivers System 2016).

National Trails System Act

The National Trails System Act of 1968 established national recreation, scenic, and historic trails. National scenic trails are designated as such "to provide for maximum outdoor recreation potential and for the conservation and enjoyment of the nationally significant scenic, historic, natural, or cultural qualities of the areas through which such trails may

pass. National scenic trails may be located so as to represent desert, marsh, grassland, mountain, canyon, river, forest, and other areas, as well as landforms which exhibit significant characteristics of the physiographic regions of the Nation" (16 USC Section 1242) (National Park Service 2016). As of 2013, the National Trails System included 11 national scenic trails, 19 national historic trails, more than 1,200 national recreation trails, and six connecting and side trails. Together the 30 scenic and historic trails total almost 54,000 miles in combined lengths (Federal Interagency Council on Trails 2014). In the National Trails System, four trails have segments in California: the Pacific Crest National Scenic Trail, Juan Bautista de Anza National Historic Trail, the Pony Express National Historic Trail, and the California National Historic Trail (National Park Service 2017). California is also home to 92 national recreational trails, totaling more than 1,100 miles (American Trails 2017).

State Laws, Regulations, and Programs

California Scenic Highway Program

In 1963, the California State Legislature established the California Scenic Highway Program, a provision of the Streets and Highways Code under the jurisdiction of the California Department of Transportation (Caltrans), to preserve and enhance the natural beauty of California (Caltrans 2016). The State highway system includes designated scenic highways and those that are eligible for designation. Official designation requires a local governing body to enact a Corridor Protection Program that protects and enhances scenic resources along the highway. A properly enforced program can include the following actions (Caltrans 2016):

- Protect the scenic corridor from encroachment of incompatible land uses, such as junkyards, dumps, concrete plants, and gravel pits;
- Mitigate activities within the corridor that detract from its scenic quality by proper siting, landscaping, or screening;
- Prohibit billboards and regulate on-site signs so that they do not detract from scenic views;
- Make development more compatible with the environment and in harmony with the surroundings;
- Regulate grading to prevent erosion and minimize alteration of existing contours and to preserve important vegetative features along the highway;
- Preserve views of hillsides by minimizing development on steep slopes and along ridgelines; and
- Prevent the need for noise barriers (sound walls) by requiring a minimum setback for residential development adjacent to a scenic highway.

Local Laws, Regulations, Plans, and Policies

Cities and counties often have established general plan elements that provide land use compatibility guidelines and locally acceptable standards to reduce conflicts between land use and planning intended for a given area. In addition, some cities and counties have adopted ordinances regulating cannabis cultivation, in some cases limiting operations by size and/or to specific land use designations and zoning areas. These types of regulations and compatibility requirements may have relevance to, or influence the potential for,

aesthetic effects of cannabis cultivation operations. For more information regarding local land use and planning regulations and compatibility requirements, plans, and policies, refer to Section 4.9, *Land Use and Planning*.

The ordinances adopted by counties and cities may include requirements to specifically address the aesthetic effects of cannabis cultivation. Appendix E, *Summary of Existing and Proposed Local Commercial Cannabis Regulations*, presents detailed information on existing county and city ordinances and requirements. For those local jurisdictions that have adopted ordinances or requirements allowing cannabis cultivation, the requirements applicable to visual resources are generally similar in nature, falling into one or more of the following categories:

Prohibitions on outdoor cultivation. Many cities have adopted ordinances that require cultivation may only occur within enclosed structures.

Fencing requirements. Local jurisdictions frequently require fences surrounding cultivation sites and/or associated activities, although specific fence height, fence material, and/or aesthetic provisions vary. Such fences are intended to, among other things, ensure screening from public view and from the view of parcels containing a "sensitive use." As an example, Lake County's current regulations for the cultivation of medical cannabis require that outdoor cultivation be completely screened from public view and the views of adjacent parcels with a fully enclosed solid fence of a minimum height of 6 feet, but not more than 8 feet, with locked gates. Lake County currently requires that medical cannabis be shielded from public view at all stages of growth. Butte County currently requires a similar fencing protocol; outdoor cultivations must be fully enclosed by a solid and enclosed fence with roughly similar height restrictions to those of Lake County. An exception is provided for cultivation sites located on parcels that are 5 acres or more in size and/or out of public view.

Setbacks. Local jurisdictions often require cultivation sites and/or associated activities to be located a specified distance from adjacent property lines, often based on the size and type of cannabis cultivation technique. As an example, Lake County's current regulations for the cultivation of medical cannabis require that outdoor cannabis not be cultivated or otherwise placed within 75 feet of any property line or within 150 feet of any off-site residence, as measured from the edge of the fence of the cultivation area.

Sensitivity to nearby receptors. Similar to setback requirements, local jurisdictions may require additional measures specific to nearby sensitive receptors. These may also take the form of setbacks, but are often tied to the locations of sensitive receptors or defined sensitive use areas rather than property lines. Sensitive use areas are typically defined as schools, school bus stops, public parks, public libraries, licensed child care centers, and other youth-oriented areas. Sensitive use areas may be linked to zoning and land use designation requirements. As an example, Shasta County mandates that cultivation sites are not allowed within 1,000 feet of sensitive use areas and shall not be visible to the general public.

Building and landscaping restrictions. Some local jurisdictions require that cannabis cultivation structures and landscaping conform with existing environmental baselines. As an example, Shasta County requires that buildings for indoor cultivation may be located in the front yard of a property.

Lighting restrictions. Some local jurisdictions require that lighting associated with cannabis cultivation be restricted to certain hours and specific wattage, and/or be shielded to prevent light trespass into the night sky and/or glare onto adjoining parcels or rights-of-way. As an example, Humboldt County requires that greenhouses using artificial light be shielded between sunset and sunrise.

4.1.4 Environmental Setting

Proposed Program Location

Proposed Program activities could occur statewide, including urban/residential, rural/ undeveloped, and agricultural areas. Surrounding aesthetic characteristics may vary widely and would depend upon the existing visual character of a given location and proximity to publicly available views, viewsheds, sensitive receptors, and related viewer sensitivities. The discussion below provides an overview of the most common site locations for cannabis cultivation operations, by cultivation technique. Because of the wide variety of locations where cannabis cultivation activities may occur, as well as the variety of city and county restrictions that are or may be placed on cannabis cultivation siting, these descriptions are not intended to encompass all possible site-specific environmental settings. Rather, the typical descriptions present the most likely representative locations for cannabis operations, based on best growing conditions, most common restrictions placed by local jurisdictions on cultivation siting, and best available information known about cannabis cultivation operations. Typical descriptions below, and the photographs provided in **Figure 4.1-1** and **Figure 4.1-2** are primarily based on information gathered from web searches on cannabis cultivation and site visits to various growing operations.

Outdoor Cultivation Site Locations and Setting

Outdoor cannabis cultivation sites are typically located in areas with rural, rural residential, and/or agricultural land uses, which are generally best suited for outdoor plant growth (e.g., temperate weather and suitable natural soils). Outdoor cultivation sites are generally located in exposed areas (e.g., cleared of trees and other obstructions and located away from urban development) where growers can make use of natural light cycles and have plenty of space to accommodate outdoor harvest operations (e.g., landscaping, pruning of plants, and tillage of natural soils) (Figure 4.1-1, photo 1). Generally, outdoor operation activities that may affect viewers would consist of the planting of rooted-cannabis cuttings or seeds in early spring, harvesting of the plants in the fall, and routine maintenance for the site, including soil preparation between harvests. As discussed in Section 4.1.3, "Regulatory Setting," some cities and counties have adopted ordinances regulating the operation of cannabis cultivation practices in designated areas or zones—specifically, in some cases, limiting outdoor cultivation to areas zoned for agriculture or rural development and/or generally restricting outdoor cultivation from urban and residential areas. Because these ordinances are typically focused on cultivation for medical use, with the passage of AUMA, cities/counties may develop new or modified local ordinances to place similar limitations on adult-use (nonmedical) cannabis cultivation.

As discussed in Chapter 3, *Proposed Program Description*, the "Emerald Triangle" region (consisting of Humboldt, Trinity, and Mendocino Counties, noted as the region producing the most cannabis in the world) is generally characterized by rural development and has an extensive supply of natural resources (Butsic and Brenner 2016). These areas are typically

best suited for outdoor cultivation and currently host numerous outdoor cultivation sites (Butsic and Brenner 2016). This region, along with others similar in climate, provides an example of the representative characteristics for locations anticipated for outdoor cultivation sites.

Unpermitted and/or Illegal Outdoor Cultivation Sites

Unpermitted and/or illegal outdoor cultivation sites currently exist in remote areas, often within federal and State recreational areas. Visual impacts resulting from unlicensed operations, including the removal of trees and vegetation from protected areas, has been a voiced concern among members of the public and state and federal agencies. However, these sites are often purposefully located within undeveloped forests, where trees, vegetation, and hillsides obstruct close-range and long-range views and criminal activities can exist unnoticed by law enforcement (Figure 4.1-2). As a result, visual sensitivity is generally considered low. The siting of cannabis cultivation operations within State and federal recreational lands would be strictly prohibited under the Proposed Program. Individuals engaging in cannabis cultivation on State and federal parks and recreational lands risk prosecution under federal, State, and local laws. Potential impacts associated with unlicensed activities are discussed in Chapter 6, *Cumulative Considerations*.

Indoor Cultivation Site Locations and Setting

Indoor cannabis cultivation sites are typically located in urban areas, where municipal utilities services are easily accessible. Indoor cultivation is conducted within buildings without the use of natural light. Indoor cultivation techniques require artificial lighting, watering, ventilation, humidification, and generally, an intense regulation of atmospheric conditions to produce multiple successful harvests per year; therefore, operations are best suited where sites have access to established municipal systems (Figure 4.1-1, photo 2). In addition, indoor cultivation is often sited in industrial areas so that, when possible, cultivation operations can utilize and/or modify existing industrial infrastructure, including large, windowless buildings and security features. Generally, indoor operation activities, including plant growth, ventilation, and climate control of the cultivation space, would not be visible to the public, as operations would occur indoors, where cultivation can be managed and monitored entirely apart from the natural environment. Operations at indoor sites that may be visible to the public could include routine maintenance of the property grounds, transportation of products out of the facility, activities surrounding security and monitoring of the facility, and inspection and monitoring activities. As discussed in Section 4.1.3, "Regulatory Setting," some cities and counties have adopted ordinances limiting the operation of cannabis cultivation practices to designated areas or zones; specifically, in some cases, these regulations prohibit the operation of indoor cultivation sites within residentially zoned areas or establish setbacks from residences, schools, or other areas designated for sensitive uses.

Photo 1. Outdoor Cultivation Site

Photo 2. Indoor Cultivation Site

Figure 4.1-1.
Typical Cultivation Sites

Photo 3. Inside Mixed-light Cultivation Site

Photo 4. Outside Mixed-light Cultivation Site

Figure 4.1-1.
Typical Cultivation Sites

Photo 5. Indoor Nursery Cultivation Site

Photo 6. Outdoor Nursery Cultivation Site

Figure 4.1-1.
Typical Cultivation Sites

Source: Young, John. 2016

Figure 4.1-2.
Typical Illegal Outdoor Cultivation Site

Mixed-light Cultivation Site Locations and Setting

Similar to outdoor cultivation sites, mixed-light cultivation sites are typically located in rural, rural residential, and/or agricultural areas. Mixed-light cultivation is conducted typically within greenhouses, where the photoperiod is manipulated using a variety of lighting and shading techniques to accomplish multiple harvests per year. A combination of natural and artificial light is utilized to achieve this process, whereby, the photoperiod is altered by using tarps or other materials to block out sunlight and shorten the photoperiod, and/or by using artificial light to extend the photoperiod. Because both natural and artificial elements come into play for mixed-light cultivation, the siting of these facilities can often require a combination of features: an open and unobstructed area for natural lighting and greenhouse structure, consideration of climate, and access to power supply. In some cases, power can be supplied by municipal companies; in other cases, generators and other materials are used to regulate an artificial climate (Figure 4.1-1, photos 3 and 4). Similar to other cultivation methods, mixed-light cultivation activities may include propagation activities, harvesting of plants, and routine maintenance for the site. Activities may also include adjustments and modifications to greenhouse structures.

Nursery and Processing Locations and Setting

Nurseries and processing sites can be located in rural and urban settings and may involve both indoor and outdoor activities (Figure 4.1-1, photos 5 and 6). Nursery operations typically consist of preparation for cutting materials and growth media; taking cuttings, treating and planting cuttings, and growing cuttings; and preparing rooted cuttings for transport and distribution. Processing operations are identified as trimming, drying, curing, and packaging of cannabis, and can be performed outdoors or indoors.

State Scenic Highways

As described in Section 4.1.3, "Regulatory Setting," the State highway system includes designated scenic highways and those that are eligible for designation. These highways are identified in Section 263 of the Streets and Highways Code. **Figure 4.1-3** shows State-designated scenic highways (Caltrans 2016).

State Scenic Vistas

Vista points are informal pullouts where motorists can safely view scenery or park and relax. Typically, they include facilities such as walkways, interpretive displays, railings, benches, interpretive information, trash receptacles, monuments, and other pedestrian facilities that are accessible to the public. The locations of scenic vistas within California are shown in **Figure 4.1-3** (Caltrans 2015).

Viewer Groups and Viewer Sensitivities

The location and size of individual cannabis cultivation sites licensed under the Proposed Program would depend on factors such as environmental conditions (appropriate climatic conditions for outdoor or mixed-light cannabis cultivation), economic factors (fees, land availability, cultivation operational costs), and land use planning (specific cannabis-related restrictions or requirements adopted by local agencies). Proposed Program activities would mostly occur in either rural or urban environments depending on the type of cultivation operation. Therefore, the viewer groups exposed to any particular cannabis cultivation site,

which may include nearby residents, employees of nearby businesses, patrons of these businesses, motorists, and/or recreationalists, would range widely. Their associated viewer sensitivities would differ as well, depending on the site-specific characteristics of a particular cannabis cultivation operation, its location, and the affected viewer groups.

Generally, residents have a heightened sensitivity to the surrounding visual character and quality because they have high frequency and duration of views, and an expectation of a consistent setting. Employees and patrons of businesses generally have moderate sensitivity to their surroundings, with interest in both the built environment and natural landscapes. Motorists' viewing sensitivities can be highly variable, depending on the presence of scenic views, duration of time traveled, purpose and speed of travel, duration of the view, and other site-specific conditions. Recreationalists generally have higher sensitivities to the surrounding viewsheds because of the nature of their use for purposes of recreation and pleasure, often with the intent of enjoying the local natural landscapes.

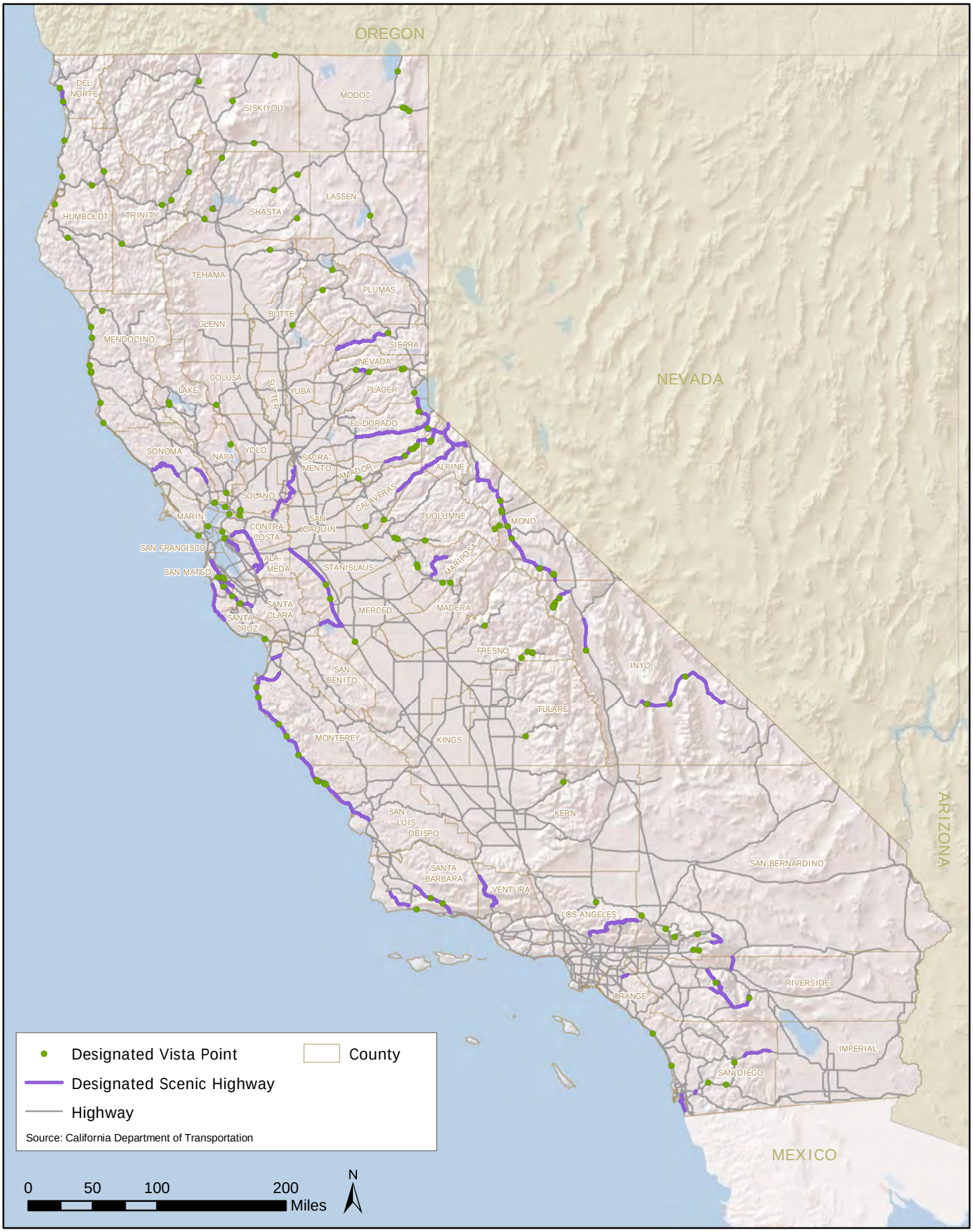
The discussion below provides an overview of the most common viewer groups and sensitivities for cannabis cultivation operations, by cultivation technique.

Outdoor Cultivation

Viewers of outdoor cultivation sites may typically include residents living in rural residential communities, motorists sharing public or private access roads leading to cultivation sites, or recreationalists with access to viewsheds surrounding a given outdoor cultivation site. Because outdoor cultivation sites typically are located in undeveloped rural areas that may include public lands, appear "natural," and/or have view durations longer than those in more developed areas, viewsheds generally may be regarded as having a higher visual quality than more developed areas. In such cases, visual sensitivities to outdoor cultivation sites may be greater in comparison to those of other cultivation techniques in more developed areas. As discussed in Section 4.1.3, "Regulatory Setting," in many cases, local ordinances require that cannabis cultivation sites be fenced and screened from public view. Outdoor cultivation would generally be considered more visible than indoor cultivation sites, which are fully enclosed within buildings.

Indoor Cultivation

Because indoor cultivation sites typically are located in urban settings, viewers of indoor cultivation sites may include residents living nearby; motorists, pedestrians, and bicyclists sharing city and county streets and roadways; and other commercial business operators operating nearby. Generally, indoor cultivation operations occur primarily within buildings in areas shielded from windows and public views. It is assumed that, due to economic factors, most indoor cultivation operations would take place within existing buildings; therefore, any visual sensitivities as a result of the buildings themselves would not differ from baseline conditions. For these reasons, visual sensitivities are considered low compared to the sensitivities at locations suitable for other cannabis cultivation types.



Horizon WATER and ENVIRONMENT

Figure 4.1-3
State Scenic Highways and Vistas

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Mixed-Light Cultivation

As with outdoor cultivation, viewers of mixed-light cultivation sites may typically include residents living in rural residential communities, motorists sharing public or private access roads leading to operation sites, or recreationists with access to viewsheds surrounding a cultivation site. Because mixed-light cultivation sites are more commonly located in undeveloped rural areas which may include public lands, appear "natural," and/or have longer view durations than those in more developed areas, viewsheds may be regarded as having a higher visual quality than more developed areas. In such cases, visual sensitivities to mixed-light cultivation sites may be greater in comparison to those of other cultivation techniques in more developed areas.

Nurseries and Processing

Viewers and viewer sensitivities would vary widely for nurseries and processing sites, which may be located in both urban and rural settings. Viewers could include residents living nearby; motorists, pedestrians, and bicyclists sharing public or private streets and roadways; other commercial business operators; or recreational viewers nearby.

Light and Glare

Nighttime lighting is necessary to provide and maintain safe and secure environments. Light that falls beyond the intended area of illumination is referred to as "light trespass." The most common cause of light trespass is spillover light, which occurs when a lighting source illuminates surfaces beyond the intended area, such as when building security lighting or parking lot lights shine onto neighboring properties. Spillover light can adversely affect light-sensitive uses, such as residences, at nighttime. Both light intensity and type of fixture can affect the amount of light spillover. Fixtures that face downward and are shielded are typically less obtrusive than upward-facing and/or unshielded light fixtures.

Glare is caused by light reflections from pavement, vehicles, and building materials, such as reflective glass, polished surfaces, or metallic architectural features. During daylight hours, the amount of glare depends on the intensity and direction of sunlight.

Local regulations frequently require licensed cultivation operations to have some form of security, which may include outdoor nighttime security lighting surrounding cultivation sites.

4.1.5 Impact Analysis

This section describes the methodology and significance criteria that were used to analyze visual impacts. It then presents the analysis of potential environmental impacts of the Proposed Program.

Methodology

Because Proposed Program activities may take place in a variety of locations and settings throughout the state, many of which are currently unknown, it is not feasible to assess site-specific impacts on views, viewsheds, visual character, or visual quality or the level of sensitivity from potential nearby receptors. In addition, the size and characteristics of a given cannabis cultivation site, and therefore the associated effects on surrounding visual

character and quality, can widely vary as a result of the type of cultivation method and associated operational practices employed by a particular cultivator. In addition, aesthetics analyses should consider effects of a project on the general environment of persons, and not on particular persons (*Eureka Citizens for Responsible Gov't v. City of Eureka*, 147 Cal. App. 4th 357, 376). Therefore, this analysis focuses on the primary activities that could, in general, affect visual character and quality.

Significance Criteria

For the purposes of this analysis, based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines, the Proposed Program would result in a significant impact related to aesthetics if it would:

A. Have a substantial adverse effect on a scenic vista;

B. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway;

C. Substantially degrade the existing visual character or quality of the site and its surroundings; or

D. Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area.

Environmental Impacts of the Proposed Program

General Cultivation Impacts

Impact AES-1: Result in a substantial adverse effect on a scenic vista, scenic resource, or State-designated scenic highway, and/or the existing visual character or quality of a site and its surroundings. (Less than Significant)

General cultivation impacts include impacts of any type of cultivation activity: outdoor, mixed-light, indoor, nursery, and processing.

As discussed in Section 4.0, *Introduction to the Environmental Analysis*, the Proposed Program regulations do not address the construction, modification, or replacement of new and/or existing permanent structures or facilities associated with cannabis cultivation sites, or the installation of structures or facilities that could result in permanent adverse effects on scenic vistas, scenic resources, State-designated scenic highways, or the existing visual character and quality of a site and its surroundings. Those issues are addressed through land use regulations and environmental review at a local level, and are further discussed in Section 6.0, *Cumulative Considerations*.

Potential visual effects associated with cultivation activities under the Proposed Program would generally include the presence of cultivation personnel and operation of equipment used for cultivation, which may be both temporary and permanent in nature.

Figure 4.1-3 demarcates State-designated scenic highways and vistas within California. It is possible that cannabis cultivation practices may be licensed in locations within view of these resources or may otherwise result in changes to existing views or viewsheds of scenic vistas. It is also possible that the Proposed Program may license individual or multiple

cannabis cultivation operations in areas that could individually or collectively result in adverse impacts on the visual character or quality of a site and its surroundings.

As part of the resource analysis conducted for the PEIR, the project team toured various indoor, outdoor, mixed-light, and nursery cultivation sites across the state. Sites were examined from various locations to determine general impacts from publicly accessible viewsheds. For example, the project team visited a medical cannabis cultivation site in Mattole Valley, southwestern Humboldt County, where greenhouses and outdoor grow operations were visible from Mattole Road, a publicly accessible roadway. While cultivation equipment was visible from portions of the roadway, particularly at relatively higher elevations with views of the valleys below, these cultivation operations were not always distinguishable from noncannabis agricultural operations, and did not appear out of place within the existing landscape mosaic. Visits to other sites suggested similar findings that, in general, visual effects associated with cultivation activities did not result in substantial impacts on the visual character or quality of an area. Indoor cultivation sites, in particular, were generally not detectable from outside the facility. Aesthetic impacts of the indoor cultivation facilities would be minimal because either the facilities would be existing prior to their use for cannabis cultivation (resulting in little or no noticeable change to the outward appearance of the building during cannabis cultivation from previous uses) or the indoor cultivation facility would be permitted and constructed in accordance with applicable local zoning, design review, and building code requirements. While it is possible that a subset of individual operations may have adverse impacts, the available information indicates that such adverse impacts are more typically associated with unpermitted grows, and that adverse aesthetic impacts of lawful cultivators are not pervasive.

In addition, as discussed in Section 4.1.2, "Terminology," the determination of an *adverse* impact, or even what might be considered by sensitive receptors as a *beneficial* impact, on visual resources depends heavily on the existing visual baseline of a given location, the proposed changes from environmental baseline associated with a particular cultivation operation, the proximity to available viewsheds and sensitive receptors, the associated viewer sensitivities, and the viewers' perception and opinions regarding the aesthetic quality of the cannabis cultivation operation. Existing, ongoing activities licensed under the Proposed Program would represent a continuation of baseline conditions. For new or altered/expanded sites that would be licensed under the Proposed Program, details necessary to conduct an analysis are generally not available, nor would it be feasible to evaluate every site at a site-specific level in this PEIR.

Finally, as discussed in Section 4.0, *Introduction to the Environmental Analysis*, the issuance of licenses as part of the Proposed Program is contingent upon cannabis cultivation sites meeting the local jurisdiction's requirements related to zoning and land use compatibility, including those applicable to visual resources. In addition, applications for individual licenses would be evaluated to determine whether site-specific conditions could lead to significant impacts at a particular location that were not considered and disclosed in this PEIR. To the extent that significant impacts are possible that have not been considered in this PEIR, a site-specific CEQA document would be required, for instance as part of the approval process undertaken by the local agency and/or other responsible agencies (including CDFA). To the extent that local regulations, or mitigation measures developed during preparation of the site-specific CEQA document, reduce impacts on visual resources, they would minimize visual variations from the environmental baseline. For example, if outdoor cultivation practices for cannabis are limited to areas where outdoor agricultural

practices are currently an acceptable land use, Proposed Program activities would likely be consistent with existing agricultural practices. In such instances, impacts on locally significant visual character, visual qualities, and visual sensitivities of such operations would likely be similar to baseline conditions.

Therefore, local land use requirements—even if they are not specific to cannabis cultivation—should ensure land use compatibility and, by extension, would address potential impacts on existing visual character and visual quality at a local level. CDFA also expects that local discretionary permitting processes for cannabis cultivation (to the extent that the local jurisdiction has established such a process) or for other aspects of site development, and related CEQA evaluations, would address, as appropriate, protection of locally and regionally important views and viewsheds from potential site-specific impacts on scenic highways, corridors, scenic vistas, and natural features. Applicants to CDFA would be required to have a site-specific evaluation as discussed above to support this conclusion—specifically, that the aesthetic impacts of the cultivation operation would not be significant—and, as appropriate, would implement measures to ensure this.

For these reasons, potential impacts on scenic vistas, scenic resources, State-designated scenic highways, and visual character/quality in general, would be **less than significant**.

Impact AES-2: Create a new source of substantial light or glare as a result of outdoor security lighting. (Less than Significant)

As discussed in Chapter 3, *Proposed Program Activities*, all types of cultivation operations (outdoor, indoor, mixed-light, and nurseries) would be required to have in place a security protocol, which may include outdoor security lighting surrounding cultivation sites. In addition, mixed-light cultivation operations may use lighting to extend the photoperiod for the cannabis plants. Such lighting may create a nuisance to adjacent and nearby properties, residences, and/or motorists traveling on nearby roadways. The degree to which such lighting would have adverse impacts on sensitive receptors would vary widely among proposed cultivation sites, but could be significant in some locations.

The Proposed Program regulations, however, would include implementation of environmental protection measures (Sections 8313 and 8314; proposed regulations are provided in **Appendix A**) requiring that all outdoor lighting be downward facing and shielded to minimize the visual effects of the presence of lighting, and that lighting for mixed-light operations is shielded between sunset and sunrise to minimize nighttime glare. With these measures in place, visual impacts from the Proposed Program would be **less than significant**.

Indoor Cultivation

Impact AES-3: Create a new source of substantial light or glare as a result of indoor cultivation techniques. (Less than Significant)

As described in Chapter 3, *Proposed Program Activities,* indoor cultivation of cannabis is entirely reliant on artificial lighting and darkness. The operation of high-intensity lighting systems has the potential to provide a new source of substantial light or glare in a given area, should lighting systems be visible outside of indoor cannabis cultivation buildings. However, because the lighting is used to stimulate photosynthetic activity and plant growth, the success of a crop is highly dependent on the regulation of light. These activities typically

take place within buildings or other enclosed areas where high-intensity lighting can be managed, without the presence of additional natural lighting from windows or spillover from other artificial lighting sources. Although there is potential for indoor high-intensity lighting to adversely affect daytime and nighttime views near a cultivation site, these operations typically are completely indoors separated from natural light areas, making this unlikely; indoor lighting would not be expected to substantially affect daytime or nighttime views of the cultivation site. Therefore, impacts resulting from indoor cultivation techniques would be **less than significant**.

Mixed-Light Cultivation

Impact AES-4: Create a new source of substantial light or glare as a result of mixed-light cultivation. (Less than Significant)

As described in Chapter 3, *Proposed Program Activities,* mixed-light cultivation of cannabis involves the cultivation of cannabis using both natural and artificial light and darkness for the purpose of controlling the life cycle of the plant. Techniques used to manipulate light, such as using tarps or other measures to exclude natural light or using low- or high-intensity artificial lighting systems, could be visible outside of greenhouses or other mixed-light facilities during the daytime or at night and could create a nuisance to adjacent and nearby properties, residences, and/or motorists traveling on affected roadways. The degree to which such lighting would create adverse impacts on sensitive receptors would vary widely among proposed cultivation sites, but could be significant in some locations.

The Proposed Program regulations, however, would include implementation of environmental protection measures requiring that artificial lighting used for the manipulation of plant growth cycles be shielded to minimize the visual effects of the presence of lighting and nighttime glare (Section 8314; see Appendix A). Therefore, visual impacts from the Proposed Program would be **less than significant**.

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4.2 Agriculture and Forestry Resources

4.2.1 Introduction

This section of the Program Environmental Impact Report (PEIR) presents the regulatory and environmental setting and potential impacts of the CalCannabis Cultivation Licensing program (Proposed Program) related to agriculture and forestry resources.

Information regarding agriculture and forestry resources presented in this section is primarily based on publications prepared by the following agencies or programs:

- California Department of Conservation (CDOC),
- California Farmland Mapping and Monitoring Program (FMMP),
- California Department of Food and Agriculture (CDFA), and
- California Department of Forestry and Fire Protection (CAL FIRE).

4.2.2 Regulatory Setting

Federal Programs and Agencies

U.S. Department of Agriculture

The U.S. Department of Agriculture (USDA) provides leadership on food, agriculture, natural resources, rural development, nutrition, and related issues (USDA 2017a). USDA is made up of 29 agencies and offices, including the U.S. Forest Service (USFS), and has nearly 100,000 employees at more than 4,500 locations across the country. USDA provides assistance to ranchers and growers through crop insurance, technical assistance, and access to credit and conducts agricultural research to develop new knowledge and technologies (USDA 2017b). USDA also partners with states to combat plant diseases, manage plant pests, and prevent the introduction and spread of noxious weeds (USDA 2017c). USDA does not have guidance or programs specifically pertaining to cannabis, as cannabis remains illegal under federal law.

U.S. Forest Service

USFS is an agency of USDA that focuses on protection and management of the nation's forests. The mission of USFS is to sustain the health, diversity, and productivity of the nation's forests and grasslands to meet the needs of present and future generations (USFS 2017). USFS fights wildland fires on national forest lands, conducts forestry research, and provides technical and financial assistance to state and local government agencies to protect and manage nonfederal forest and associated range and watershed lands (USFS 2017). USFS does not provide guidance or have programs pertaining to cannabis, as cannabis remains illegal under federal law. As described in Section 4.11, *Public Services*, the USFS Law Enforcement and Investigations division currently works to eradicate illegal production of cannabis on national forest lands.

U.S. Department of the Interior

Bureau of Land Management

The Bureau of Land Management (BLM) is an agency of the U.S. Department of the Interior responsible for the management of public lands and subsurface mineral resources. BLM manages 245 million acres of surface land and 700 million acres of subsurface mineral estate. BLM operates in accordance with the Federal Land Policy and Management Act of 1976, which instructs BLM to administer public lands "on the basis of multiple use and sustained yield" of resources (BLM 2017). Multiple uses under BLM management include renewable energy development, conventional energy development, livestock grazing, hardrock mining, timber harvesting, and outdoor recreation (BLM 2017). BLM does not have guidelines or programs specifically pertaining to cannabis, as cannabis remains illegal under federal law. Similar to USFS, BLM provides law enforcement services on public lands, including pursuing investigations of cannabis cultivation.

National Park Service

The National Park Service (NPS) is an agency of the U.S. Department of the Interior responsible for managing national parks, national monuments, and other public lands within the National Park System. The National Park System covers more than 84 million acres and is comprised of 417 sites with at least 19 different designations. These include 129 historical parks or sites, 87 national monuments, 59 national parks, 25 battlefields or military parks, 19 preserves, 18 recreation areas, 10 seashores, four parkways, four lakeshores, and two reserves. The mission of the NPS is to "preserve unimpaired the natural and cultural resources and values of the national park system for the enjoyment, education, and inspiration of this and future generations." A limited number of NPS-managed sites allow for agricultural activity (e.g., Point Reyes National Seashore in California, Cuyahoga Valley National Park in Ohio). NPS does not have guidelines or programs specifically pertaining to cannabis, as cannabis remains illegal under federal law. NPS provides law enforcement services, including investigation and eradication of cannabis cultivation, on NPS-managed lands.

State Agencies, Laws, and Programs

Farmland Mapping and Monitoring Program

CDOC established the FMMP in 1982 as a nonregulatory program to provide a consistent and impartial analysis of agricultural land use and land use changes throughout California. Creation of the FMMP was supported by the California State Legislature and a broad coalition of building, business, government, and conservation interests. The first Important Farmland maps, produced in 1984, covered 30.3 million acres in 38 counties. This is an ongoing data set; CDOC collects data every 2 years to assist in understanding changes in agricultural land in the state. Data now span more than 32 years and have expanded to 49.1 million acres as modern soil surveys have been completed by USDA. FMMP now maps agricultural and urban land use for nearly 98 percent of California's privately held land (CDOC 2015a).

The FMMP has developed categorical definitions of Important Farmland that incorporate the land's suitability for agricultural production rather than solely relying on the physical and chemical characteristics of the soil. The FMMP includes data on the location of agricultural land, land use changes from agriculture to urban development, and soil quality. Land that is identified as Important Farmland is mapped as one of the following four categories (CDOC 2016a):

Prime Farmland. Farmland with the best combination of physical and chemical features able to sustain long-term agricultural production. These lands have the soil quality, growing season, and moisture supply needed to produce sustained high yields. Prime Farmland must have been used for irrigated agricultural production at some time during the 4 years before the FMMP's mapping date.

Farmland of Statewide Importance. Farmland similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture. Farmland of Statewide Importance must have been used for irrigated agricultural production at some time during the 4 years before the FMMP's mapping date.

Unique Farmland. Farmland of lesser quality soils used for the production of the state's leading agricultural crops. These lands usually are irrigated but may include nonirrigated orchards or vineyards as found in some climatic zones. Unique Farmland must have been cropped at some time during the 4 years before the FMMP's mapping date.

Farmland of Local Importance. Land of importance to the local agricultural economy as determined by each county's board of supervisors and a local advisory committee.

California Land Conservation Act of 1965 (Williamson Act)

The California Land Conservation Act of 1965, better known as the Williamson Act, is California's primary program to protect agricultural land. The Williamson Act discourages premature and unnecessary conversion of agricultural land to urban uses. The legislation benefits landowners by allowing them to enter into long-term contracts (10 or 20 years) with the State of California to keep agricultural land in production. In return, the State reduces property taxes based on a complex calculation tied to agricultural income. The State implements the Williamson Act when a city or county creates an agricultural preserve. The purpose of an agricultural preserve is the long-term conservation of agricultural and open space lands; the lands are restricted to agricultural, open space, or recreational uses in exchange for reduced property tax assessments. After a preserve is established, the landowner enters into a contract with a city or county. The landowner and any successors-in-interest are obligated to adhere to the contract's enforceable restrictions unless the contract is rescinded or cancelled. In 1998, an option was added in the Williamson Act Program to create Farmland Security Zones (FSZs), which are areas within an agricultural preserve that offer private landowners a greater property tax reduction than the regular assessment within the Williamson Act. Land restricted by an FSZ contract is valued for property assessment purposes at 65 percent of its Williamson Act valuation (CDOC 2016b). The minimum initial term of FSZs is 20 years, and the contracts renew annually unless the nonrenewal process is initiated. Except under limited circumstances, land subject to an FSZ contract cannot be annexed into a city or a special district that provides non-agricultural services, or acquired by a school district for use as a public school.

Williamson Act and FSZ contracts may be terminated by nonrenewal or cancellation. If a 10- or 20-year contract is terminated through nonrenewal, a 9- or 19-year nonrenewal period must be initiated by either the landowner or the city or county, during which time the land is still under contract, and the property taxes rise by a statutory formula during the last nine years of either form of contract. If a contract is terminated through cancellation, a city or county must make findings specific to each type of contract to justify cancellation. However, under several provisions of the Williamson Act, land under contract may be removed from contract to convert land to a nonagricultural use. Land may be acquired from a willing seller or by public acquisition for a public improvement project.[1] In 2008, Assembly Bill 2921 was enacted, providing a mechanism to rescind Williamson Act agricultural contracts to enter into either an open space contract under the Williamson Act or an open space easement. Under the new provisions, the resulting agreement must be at least as restrictive as the contract it replaces, and the affected parcel must be large enough to provide open space benefits.

According to the *California Land Conservation Act 2014 Status Report*, approximately 15.4 million acres were enrolled under the Williamson Act statewide as of January 1, 2013 (CDOC 2015b). Of California's 58 counties, all have adopted the Williamson Act program except Del Norte, San Francisco, Inyo, and Yuba Counties. The Imperial County Board of Supervisors voted in 2010 not to renew all Williamson Act contracts. The FSZ program has been adopted by 25 counties, although not all of these counties have executed contracts; 20 counties reported a total of 874,946 acres of land under FSZ contract, which constituted approximately 6 percent of the statewide Williamson Act enrollment.

The Open Space Subvention Act of 1971 provided local governments an annual subvention of forgone property tax revenues from the State through 2009; these payments have been suspended since that time because of revenue shortfalls. Consequently, some counties have removed lands from Williamson Act contracts. In 2010, Senate Bill 863 restored funding to a statewide level of $10 million for the 2010–2011 fiscal year. However, in 2011, Senate Bill 80 terminated this fund, although Assembly Bill 1265 reinstated the subvention to allow eligible counties to recapture 10 percent of the property tax benefits provided to the owners of Williamson Act lands. (CDOC 2011)

California Department of Food and Agriculture

CDFA implements programs to support California agriculture and food production with a number of programs, including but not limited to improved quality assurance, animal safety programs, production, on-farm safety management practices, and programs for processors of farm products. CDFA also conducts pest and disease prevention activities and programs to respond to emergencies that threaten California's food and agriculture. CDFA is responsible for inspection services regarding standardization and quality of food and agricultural products, and both federal and state organic farming products. CDFA's Division of Measurement Standards works to ensure the accuracy of commercial weighing and measuring devices. As described in Chapter 2, *Proposed Program Description*, of this PEIR, under the Medical Cannabis Regulation and Safety Act (MCRSA) and the Adult Use of Marijuana Act (AUMA), CDFA now has the responsibility of licensing medical and adult-use

[1] Note that it is the State's policy is to avoid, whenever practicable, acquiring land in agricultural preserves for the location of any federal, State, or local public improvements and any improvements of public utilities.

(nonmedical) cannabis cultivation and is also responsible for cannabis weighing devices and aspects of labeling.

Forest Land, Timberland, and the Taxation Reform Act

Forest land is defined as native tree cover greater than 10 percent that allows for the management of timber, aesthetics, fish and wildlife, recreation, and other public benefits (California Public Resources Code [PRC] Section 12220[g]). A subset of forest land, timberland, is privately owned land or land acquired for State forest purposes that is devoted to and used for growing and harvesting timber, or for growing and harvesting timber and compatible uses, and which is capable of producing an average annual volume of wood fiber of at least 15 cubic feet per acre per year (PRC Section 51104[f]).

The Forest Taxation Reform Act, enacted in 1976, provides guidelines that allow cities and counties with qualifying timberland to adopt timber protection zones (TPZs). PRC Section 51104(g) defines TPZs as areas zoned in accordance with Sections 51112 and 51113 for the purposes of growing and harvesting timber, or for growing and harvesting timber and compatible uses. TPZs are privately owned land or land acquired for State forest purposes. When a TPZ is established, a private landowner agrees to commit the land to forest production for at least 10 years. In return, the approving jurisdiction grants the landowner a property tax reduction. CAL FIRE has regulatory authority over timber harvest and timberland conversion decisions in TPZs.

California Department of Forestry and Fire Protection

The California Forest Practice Act, adopted in 1973, requires owners of nonfederal timberland to apply for a Timberland Conversion Permit from the Director of the California Department of Forestry and Fire Protection (CAL FIRE 2016) for the conversion of timberland to another use. CAL FIRE may grant exemptions for conversions of less than 3 acres. To qualify for an exemption from CAL FIRE, applicants must comply with applicable provisions of the Forest Practice Act and regulations, county general plans, zoning ordinances, and other implementing ordinances of the local jurisdiction. The Forest Practice Act and implementing regulations also govern the removal of "commercial" timber species from areas of pending new construction (CAL FIRE 2016).

Local Laws, Plans, Policies, and Regulations

General Plans

General plans are long-range comprehensive plans developed for cities and counties to govern growth and development. Many county general plans include goals and policies to preserve agricultural land and forest resources through a variety of mechanisms, such as creation of urban growth boundaries, designation of agricultural overlay zones, requirement of buffers between agricultural and other uses, and mitigation fees for conversion of agricultural land associated with development. City general plans also may have some provisions for the protection of agricultural land and/or forest lands. An increasing number of county general plans include provisions to promote organic agriculture.

Local Regulations

At the time this PEIR was prepared, Humboldt County and Lake County had adopted ordinances related to cannabis cultivation in areas designated for forestry and/or agricultural uses.

For example, Humboldt County's Medical Marijuana Land Use Ordinance requires applicants seeking use permits for cannabis cultivation activities on land in forest-related zoning districts to obtain timberland conversion authorization from CAL FIRE (Humboldt County Ordinance No. 2559 55.4.10[j]). Owners of existing cultivation operations that occupy sites created through prior unauthorized conversion of timberland are advised to obtain the appropriate permit or, alternatively, provide evidence showing that the landowner has completed a civil or criminal process and/or entered into a negotiated settlement with CAL FIRE (EPIC et al. 2016). In addition, this ordinance requires that, for new outdoor and mixed-light cultivation sites of more than 6 acres, no more than 20 percent of the area of Prime Agricultural Soils on a parcel be used for commercial medical cannabis cultivation (EPIC et al. 2016).

Lake County has also developed Regulations for the Cultivation of Medical Marijuana (Article 72, Section 21-72), which allow cannabis cultivation within certain zoning districts, including the "A" Agriculture zoning district. Cultivation is only allowed by individuals who have a current and valid physician recommendation or State-issued Medical Marijuana Identification Card, or by a collective of such individuals. This regulation also requires that outdoor cultivation operations not exceed 48 mature plants or 72 immature plants on a minimum of 20 acres (Lake County 2014).

4.2.3 Environmental Setting

The following discussion describes agriculture and forestry resources related to the Proposed Program.

Agricultural Resources

In accordance with the U.S. Department of Agriculture's classification of Agricultural Districts, California is divided into eight agricultural regions by the following counties:

North Coast: Del Norte, Humboldt, and Mendocino

North Mountain: Siskiyou, Shasta, and Trinity

Northeast: Modoc, Lassen, and Plumas

Central Coast: Lake, Sonoma, Napa, Marin, Contra Costa, Alameda, San Francisco, San Mateo, Santa Clara, Santa Cruz, San Benito, Monterey, and San Luis Obispo

Sacramento Valley: Tehama, Glenn, Butte, Colusa, Sutter, Yuba, Yolo, Solano, and Sacramento

San Joaquin Valley: San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern

Sierra Nevada Mountains: Sierra, Nevada, Placer, El Dorado, Amador, Alpine, Calaveras, Tuolumne, Mariposa, Mono, and Inyo

Southern California: Santa Barbara, Ventura, Los Angeles, San Bernardino, Orange, Riverside, San Diego, and Imperial

California Agricultural Production

The combination of a mild Mediterranean climate and fertile soil allows year-round agricultural production in California. More than 400 different commodities are produced, ranging from fruits, vegetables, nuts, and dairy products to nursery commodities. The approximately 76,400 working farms and ranches in California produce more than one-third of the United States' vegetables and two-thirds of the country's fruits and nuts (CDFA 2015).

Figure 4.2-1 shows the areas designated by CDOC as Important Farmlands in California. The map reflects the distribution of areas most conducive to agricultural production. Each of these areas is described in more detail below.

Approximately half of California's 30 million acres of farmlands are enrolled in the Williamson Act. These 15.4 million acres represent nearly one-third of the privately owned land in the state. Of the land enrolled in the Williamson Act, 5 million acres are considered Prime Farmland. About 874,900 acres are part of the FSZ program, and the remainder is Williamson Act non-prime farmland. In 2013, Kern County had the greatest acreage enrolled in the Williamson Act, with 1.7 million acres, followed by Fresno County with 1.5 million acres (CDOC 2015b). Most of the Important Farmland in California is in the Central Valley (made up of the Sacramento and San Joaquin Valleys). The western half of the San Joaquin Valley contains broad stretches of Prime Farmland, while the eastern portion of the San Joaquin Valley contains a mixture of the four types of Important Farmland. The western portion of Colusa County has a large, contiguous area of Farmland of Local Importance. The Klamath Basin in Siskiyou County in the northeast region also includes broad areas of Farmland of Local Importance. Both the central coast and southern California regions contain a mixture of Prime Farmland and Farmland of Statewide Importance. The total acreages of each type of Important Farmland are listed in **Table 4.2-1**.

Table 4.2-1. Important Farmland Acreages in California

Important Farmland Categories	Acres
Farmland of Local Importance	3,173,968
Farmland of Statewide Importance	2,599,222
Prime Farmland	5,099,009
Unique Farmland	1,343,216

Source: CDOC 2015a

Table 4.2-2 provides an agricultural profile of California's primary agricultural counties by region, with acreages of Important Farmland, Farmland of Local Importance, Williamson Act enrollment, and primary agricultural commodities.

The following descriptions provide an overview of the various agricultural regions in California. They also generally describe the extent of known cannabis cultivation activities in these regions.

North Coast

In terms of gross value, the leading agricultural commodities produced in the North Coast Region are milk and dairy products and cattle, as well as fruits, such as grapes and pears. Abundant forests in the region provide for a robust production of timber supplies; for example, in 2014, Humboldt County timber value was more than $81 million (almost one-third of Humboldt County's agriculture production, excluding cannabis), and Mendocino County timber value was more than $34 million (CDFA 2015). Additionally, pastoral activities are a large part of the agricultural economies of the North Coast counties (CDFA 2015).

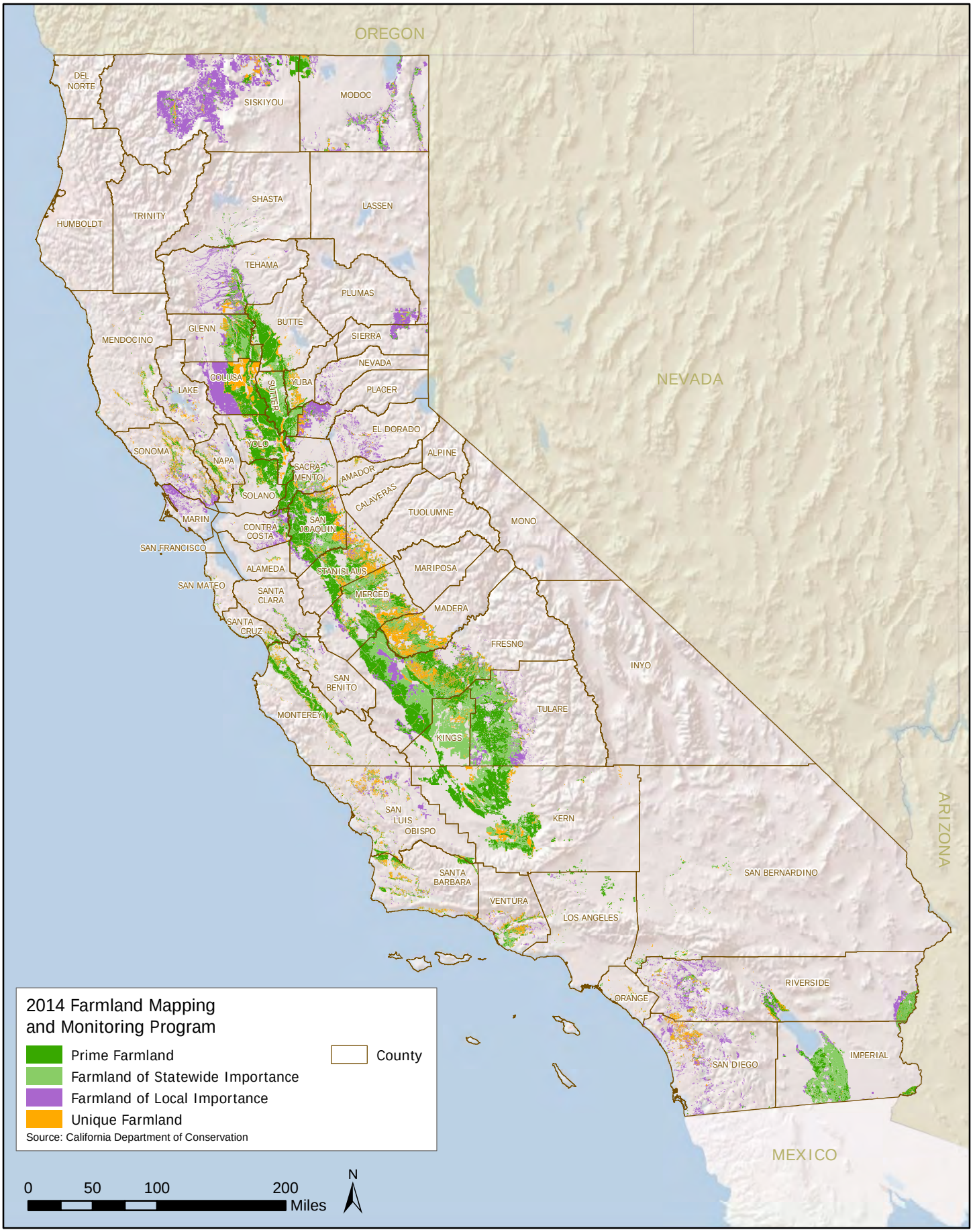
Humboldt and Mendocino Counties are also known for cannabis cultivation. These two counties have been viewed as ideal locations for cannabis cultivation because they are remote, heavily forested, and sparsely populated (Bauer et al. 2015). While it is difficult to precisely quantify cannabis production due to the lack of statewide regulation and tracking, cannabis production is by far the highest value agricultural crop in the region. In 2014, the total agricultural production value, excluding cannabis, was approximately $500 million for the North Coast Region (CDFA 2015). For the year 2016, cannabis production for the North Coast is estimated at approximately $6 billion (ERA Economics 2017).

North Mountain and Northeast Regions

The leading agricultural commodities in the North Mountain and Northeast Regions are hay, cattle, pasture, rangeland, forest products, rice, and nursery production. Some of the highest valued commodities in this region are rice, walnuts, almonds, and cattle (California State University Chico 2014). Trinity County is heavily forested and is also known for unpermitted cannabis cultivation.

Sierra Nevada Mountains

Mountainous areas generally are not known for their agricultural production. The Sierra Nevada Mountains Region is characterized by irrigated, specialized crops in the foothills and grazing land in the drier high altitudes, with some crop production in the wetter high-altitude areas (Momsen 1996). The foothill regions of the northern Sierra Nevada are known for cannabis cultivation.



Horizon WATER and ENVIRONMENT

Figure 4.2-1
Important Farmlands in California

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Table 4.2-2. Agricultural Profiles by Region and County (2012-2014)

Region and County	Total Area of Important Farmland (acres)	Prime Farmland (acres)	Farmland of Statewide Importance (acres)	Unique Farmland (acres)	Farmland of Local Importance (acres)	Williamson Act Lands (acres)[1]	Primary Agricultural Commodities
Central Coast and San Francisco Bay Area							
Alameda	6,803	3,434	1,110	2,259	0	135,647	Grapes, Woody Ornamentals, Cattle, Pasture
Contra Costa	88,911	25,502	7,435	3,543	88,911	43,537	Cattle, Corn, Grapes, Tomatoes
Lake	45,831	10,128	827	11,207	45,831	None listed	Grapes, Pears, Walnuts, Cattle & Calves
Marin	63,767		141	280	63,345	99,219	Milk, Cattle, Pasture, Poultry
Monterey	236,282	166,188	43,992	26,102	0	789,437	Strawberries, Lettuce, Broccoli
Napa	75,191	30,655	9,574	16,312	18,651	71,580	Grapes, Nursery, Cattle & Calves, Olives
San Benito	54,729	26,981	6,914	2,262	18,572	579,430	Unspecified vegetables, Lettuce, Spinach, Bell Peppers
San Francisco[2]	None listed	None listed	None listed	None listed	None listed	None listed	Field Crops, Apiary Products
San Luis Obispo	164,171	40,989	21,909	43,225	58,048	793,957	Grapes, Strawberries, Cattle & Calves, Vegetables
San Mateo	4,818	1,998	146	2,100	573	None listed	Nursery Plant), Nursery Products, Brussels Sprouts, Flowers
Santa Barbara	126,522	67,216	13,000	36,585	9,722	545,324	Strawberries, Grape, Broccoli, Unspecified Vegetables

Region and County	Total Area of Important Farmland (acres)	Prime Farmland (acres)	Farmland of Statewide Importance (acres)	Unique Farmland (acres)	Farmland of Local Importance (acres)	Williamson Act Lands (acres)[1]	Primary Agricultural Commodities
Santa Clara	26,621	15,692	3,384	2,440	5,106	305,500	Mushrooms, Nursery Plants and Products
Santa Cruz	19,947	13,688	2,405	3,554	300	16,238	Strawberries, Raspberries, Nursery, Flowers
Solano	146,059	130,292	6,546	9,221	0	269,997	Tomatoes, Walnuts, Hay (Alfalfa), Nursery
Sonoma	161,441	29,898	17,203	33,399	80,941	271,611	Grapes, Milk, Poultry, Livestock
North Coast							
Del Norte[2]	None listed	None listed	None listed	None listed	None listed	None listed	Cattle, Milk, Nursery, Manufactured Dairy
Humboldt[2]	None listed	None listed	None listed	None listed	None listed	203,579	Cattle & Calves, Nursery, Milk, Cattle
Mendocino	27,650	19,208	1,227	7,215	0	None listed	Grapes, Cattle & Calves, Pears, Milk
North and Northeast							
Lassen[2]	None listed	None listed	None listed	None listed	None listed	333,669	Hay, Unspecified Vegetables, Cattle
Modoc	285,325	76,002	42,398	16,531	150,395	127,629	None listed
Plumas[3]	79,453	None listed	None listed	None listed	None listed	78,400	Cattle, Hay, Pasture
Shasta	19,169	10,508	2,742	506	5,413	187,179	Forest Products, Hay, Cattle, Rice
Siskiyou	754,306	70,722	25,963	35,375	622,245	421,443	Nursery, Hay (Alfalfa), Cattle & Calves, Wheat
Trinity[2]	None listed	None listed	None listed	None listed	None listed	None listed	None listed
Sacramento Valley							
Tehama	232,013	62,446	18,694	20,603	130,271	799,918	Walnuts, Plums, Almonds, Olives

Region and County	Total Area of Important Farmland (acres)	Prime Farmland (acres)	Farmland of Statewide Importance (acres)	Unique Farmland (acres)	Farmland of Local Importance (acres)	Williamson Act Lands (acres)[1]	Primary Agricultural Commodities
Glenn	292,646	157,781	87,939	17,625	29,301	424,053	Rice, Almonds, Milk, Walnuts
Butte	236,297	192,292	21,575	22,430	0	216,184	Rice, Walnuts, Almonds, Plums
Colusa	549,095	196,403	2,465	120,345	229,882	319,397	Almonds, Rice, Walnuts, Tomatoes
Sutter	281,107	161,018	104,002	16,086	0	64,573	Walnuts, Rice, Plums, Peaches
Yuba	82,837	39,069	10,769	32,999	0	N/A	Walnuts, Rice, Plums, Peaches
Yolo	336,245	250,345	18,861	44,604	22,435	Not listed	Tomatoes, Almonds, Walnuts, Rice
Sacramento	208,650	91,569	43,104	15,125	58,852	180,821	Grapes, Milk, Pears, Poultry
San Joaquin Valley							
San Joaquin	609,730	382,878	82,271	76,416	68,164	517,218	Almonds, Milk, Walnuts, Grapes
Stanislaus	418,656	252,699	32,183	105,631	28,143	682,747	Almonds, Milk, Chickens, Walnuts
Merced	600,940	271,913	154,502	112,300	62,225	467,945	Milk, Almonds, Cattle & Calves, Chickens
Madera	369,372	97,960	85,056	176,043	10,314	539,878	Almonds, Milk, Pistachios, Grapes (Raisin)
Fresno	1,355,336	678,103	404,085	93,654	179,494	1,494,558	Almonds, Milk, Chickens, Grapes (Raisin)
Kings	496,501	112,255	365,025	19,221	0	677,257	Milk, Cotton, Cattle & Calves, Almonds

Region and County	Total Area of Important Farmland (acres)	Prime Farmland (acres)	Farmland of Statewide Importance (acres)	Unique Farmland (acres)	Farmland of Local Importance (acres)	Williamson Act Lands (acres)[1]	Primary Agricultural Commodities
Tulare	835,266	366,413	320,887	11,422	136,544	1,096,299	Milk, Cattle & Calves, Oranges, Grapes
Kern	884,706	585,034	209,564	90,108	0	1,698,705	Grapes, Almonds, Milk, Tangerines
Sierra Nevada Mountains							
Alpine[2]	None listed	None listed	None listed	None listed	None listed	None listed	Cattle, Pasture, Hay
Amador	10,096	2,980	1,446	3,439	2,232	9 2,428	Grapes, Cattle & Calves, Pasture, Hay (Alfalfa)
Calaveras[2]	None listed	None listed	None listed	None listed	None listed	142,896	Cattle & Calves, Pasture, Grapes, Walnuts
El Dorado	64,007	596	813	3,216	59,381	3 4,154	Apples, Cattle & Calves, Grapes, Pasture
Inyo[2]	None listed	None listed	None listed	None listed	None listed	None listed	Cattle, Hay (Alfalfa), Cattle
Mariposa	337	6	38	292	0	207,710	Cattle & Calves, Pasture, Turkey, Chickens
Mono[2]	None listed	None listed	None listed	None listed	None listed	129	Hay (Alfalfa), Cattle (Steers), Field Crops
Nevada	25,430	309	1,274	436	23,411	2,485	Cattle (Heifers), Cattle, Pasture
Placer	127,958	7,406	4,004	17,947	98,601	41,956	Rice, Cattle & Calves, Nursery, Livestock
Sierra[3]	29,251	None listed	None listed	None listed	None listed	40,548	Cattle, Hay, Pasture
Tuolumne[2]	None listed	None listed	None listed	None listed	None listed	120,159	Livestock, Cattle and Calves, Nursery, Pasture
Southern California							
Los Angeles	31,284	25,427	826	1,068	3,964	40,031	Nursery, Onions, Nursery Plants, Hay (Alfalfa)
Orange	6,071	2,551	305	3,214	0	0	Nursery, Strawberries, Lemons, Avocados

Region and County	Total Area of Important Farmland (acres)	Prime Farmland (acres)	Farmland of Statewide Importance (acres)	Unique Farmland (acres)	Farmland of Local Importance (acres)	Williamson Act Lands (acres)[1]	Primary Agricultural Commodities
San Bernardino	20,697	11,715	5,701	2,675	605	4,542	Milk, Eggs, Cattle, Hay
Ventura	118,445	41,142	33,044	28,699	15,560	127,089	Strawberries, Celery, Raspberries, Lemons
Riverside	423,469	118,077	44,002	32,582	228,809	None listed	Nursery Products, Milk, Grapes
San Diego	214,764	5,987	8,287	45,725	154,764	61,672	Nursery Products, Flowers, Avocados, Tomatoes
Imperial	530,518	190,589	297,557	1,970	40,402	None listed	Cattle, Lettuce, Wheat, Hay, Onions

Notes:

[1] Includes land under the following contracts: Land Conservation Act, Farmland Security Zone, Agricultural Conservation Easement, and other Enforceable Restriction.

[2] Agriculture acreage has not been mapped and is therefore unavailable.

[3] Data were provided for Plumas and Sierra Counties of 2,288,000 acres. The county value represents the weighted value based on county total acreage for the counties represented.

Sources: CDOC 2015b, 2015c; CDFA 2015

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Central Coast

California's Central Coast Region lies between the ocean and a series of mountains. The climate tends to be cool in the summer and warm in the winter. The highly productive Salinas Valley in Monterey County is an approximately 90-mile strip of land that runs in a southeast to northwest direction, following the direction of the Salinas River. Lettuce, spinach, broccoli, cauliflower, strawberries, and asparagus, among other crops, are grown in the Salinas Valley. Agricultural areas in and around the San Francisco Bay Area feature abundant wine grape production, and several northern Bay Area counties produce milk and other dairy products. Fruit, nut, and vegetable production occurs throughout the region as well, including along the San Mateo and Santa Cruz County coasts. Monterey County recently adopted cannabis ordinances for both personal and commercial cultivation, and Santa Cruz County is in the process of establishing an ordinance, implying that cultivation activity occurs to some extent in these counties. San Luis Obispo County is also a known location for cannabis cultivation.

Central Valley

California's Central Valley (as stated previously, the combined Sacramento Valley and San Joaquin Valley), a large, flat swath of land covering more than 42,000 square miles in the middle of the state, contains the majority of agricultural land in California. Six of the top seven agricultural counties in California are in the Central Valley. The Sacramento Valley encompasses large portions of Tehama, Glenn, Butte, Colusa, Sutter, Yuba, Yolo, Solano, and Sacramento Counties. The San Joaquin Valley encompasses large portions of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern Counties.

The Sacramento and San Joaquin Valleys vary considerably in type of crop production. In general, the climate warms considerably from north to south in the Central Valley, and precipitation decreases from north to south, from an annual average of 32 inches at Chico in the northern Sacramento Valley to 6.5 inches in Bakersfield in the south. In recent years, cannabis cultivation has grown exponentially in the Central Valley (CVRWQCB 2014), although some counties (e.g., Fresno, Tulare) have enacted prohibitions on cannabis cultivation.

Southern California

The Southern California Region produced a variety of crops from the early 1900s to the mid-1930s, but the landscape has changed considerably with urban and suburban development. Nonetheless, the region remains a major force in agriculture. As shown in Table 4.2-2, Southern California continues to produce a variety of crops, including nursery stock, lemons, avocados, tomatoes, and hay.

Imperial County lies in southeastern California. It contains an area known as the Imperial Valley, a large structural trough between the Coachella Valley and the Gulf of California, mostly below sea level. The Imperial Valley produces more than 100 different crops on one-half million acres of land (Imperial County Farm Bureau 2016). Imperial Valley is one of California's top five producers of spinach, potatoes, cauliflower, sweet corn, broccoli, and onions and is a major producer of hay for the state's dairy industry.

In Riverside County, the City of Desert Hot Springs was one of the first municipalities to allow cannabis cultivation. Since the ordinance passed in 2014, officials have approved applications for at least 11 businesses with plans for more than 1.7 million square feet of cultivation operations to help boost its economy. The City of Adelanto in San Bernardino County adopted a similar ordinance to help improve its economic difficulties (Esquivel 2016), so it is presumed that cannabis cultivation occurs in this region. In spite of these local regulations, cannabis cultivation is currently prohibited in the unincorporated portions of Riverside and San Bernardino Counties.

Cannabis Cultivation as Agricultural Product

Under Health and Safety Code Section 11362.777(a), and Business and Professions Code Section 26067(a), respectively, medical and adult-use cannabis are agricultural products.

Forestry Resources

Forest Land

Forests can serve as high-quality habitat for fish and wildlife species, sequester carbon to offset climate change effects, capture runoff for agricultural and domestic water supply, and provide a variety of outdoor recreation and education opportunities. California's forests and rangelands face a variety of threats, including forest land conversion to more developed land uses, wildfires (which have increasingly occurred in conifer forests), and forest pests. Climate change is a more recent challenge to forests since future precipitation amounts and patterns are becoming uncertain, and trees will become more susceptible to wildfire, pests, and disease (CAL FIRE Fire Resource and Assessment Program 2010).

Cannabis Cultivation within Forests

As mentioned previously, Humboldt, Mendocino, and Trinity Counties are the major counties known for cannabis cultivation in California. All three counties have been viewed as ideal locations for cannabis cultivation because they are remote, heavily forested, and sparsely populated (Bauer et al. 2015) and have a climate suitable for agriculture (Kolhatkar 2010). Studies have found that selecting remote, forested areas reduces the likelihood for cannabis cultivation activities to be detected. (Thompson et al. 2014.). Several studies, however, document the size and impacts of cannabis cultivation on California forest lands.

Conversion of forest land to cannabis cultivation sites is documented in multiple sources (California Department of Fish and Wildlife [CDFW] 2016a, Gabriel et al. 2013, Thompson et al. 2014, Office of National Drug Control Policy 2016). However, the total amount of converted forest land is difficult to ascertain, given the clandestine nature of these activities. Reports have noted that impacts have increased in regions such as the Central Valley and North Coast, as the number of grows and the size of grow operations have grown exponentially in recent years (North Coast Regional Water Quality Control Board [NCRWQCB] 2013, CVRWQCB 2014, State Water Resources Control Board [SWRCB] et al. 2014).

Several studies have attempted to quantify the extent of cannabis cultivation in forested areas. For example, Bauer et al. (2015) conducted a study to estimate the potential effects that water diversions from cannabis cultivation sites could have on streamflow in four

study watersheds. The study estimated the location and size of cultivation sites (both outdoor plantations and greenhouse locations) within three watersheds in Humboldt County and one watershed in Mendocino County. Bauer et al. identified cannabis cultivation sites by interpreting high-resolution aerial imagery. Low-altitude aircraft flights and search warrants executed by law enforcement at cultivation sites in the region helped to validate assumptions used in aerial imagery interpretation. The study area encompassed 299,034 acres and included an estimated 1,932 cannabis cultivation sites that totaled approximately 228 acres (CDFW 2016). The number of sites was considered an estimate due to uncertainties associated with the site identification methods: Not all cannabis grow site locations are reported; smaller clearings are likely not captured in the data set due to difficulties identifying and delineating smaller sites using aerial imagery; some sites are intentionally placed in areas where they are harder to detect (e.g., sites with higher canopy closure). Bauer et al. observed that the study watersheds were dominated by a matrix of open- to closed-canopy, mixed evergreen and mixed conifer forests with occasional grassland openings.

CDFW has also studied the impacts of cannabis cultivation on forest habitats, such as the degradation and removal of conifer and riparian forest, which has been identified as adversely affecting species that use these habitats (e.g., northern spotted owl) (CDFW 2016). CDFW's analysis built on the study by Bauer et al. (2015) to estimate the potential impact of cannabis cultivation sites on northern spotted owl habitat within five watersheds in Northern California, encompassing 621,006 acres. Although the northern spotted owl's habitat requirements focus on particular types of forest habitat and features of these areas, the study provides useful information to consider within the context of forest conversion. In addition to the four watersheds evaluated by Bauer et al. (2015), CDFW also delineated cultivation sites in the Mad River Creek watershed that encompasses portions of Mendocino and Trinity Counties. The study area included an estimated 2,348 cannabis cultivation sites. The estimated area of these cultivation sites was 362 acres. Similar to Bauer et al. (2015), these numbers were considered an estimate due to uncertainties associated with the site identification methods.

4.2.4 Impact Analysis

This section describes the methodology and significance criteria that were used to analyze impacts of the Proposed Program on agriculture and forestry resources. It also presents the analysis of the potential environmental impacts of the Proposed Program.

Methodology

The impact analysis qualitatively assesses the potential effects of the Proposed Program on agriculture and forestry resources. Because the Proposed Program does not involve construction, modification, or replacement of cannabis cultivation facilities, construction-related impacts associated with converting agricultural land to nonagricultural uses, or forest land and timberland to nonforest uses, are not evaluated in this section. Such impacts are considered as part of the cumulative impact analysis contained in Chapter 6, *Cumulative Considerations*.

Instead, the impact analysis focuses on the operational effects of cannabis cultivation licensed under the Proposed Program. It is assumed that Proposed Program activities would occur either at existing cannabis cultivation facilities or new locations, including facilities that have not yet been constructed. Although an inventory of the precise locations where Proposed Program activities would be conducted would be infeasible, the analysis assumes that outdoor and mixed-light cultivation facilities primarily operate in agricultural, forested, or open space areas and not in urban or heavily developed areas of California. Because indoor cannabis cultivation operations potentially have greater spatial/location diversity than outdoor or mixed-light cultivation operations, it is assumed that indoor cultivation operations could occur in agricultural, open space, or forested areas as well as in urban and heavily developed areas.

Significance Criteria

For the purposes of this analysis, based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines, the Proposed Program would result in a significant impact on agriculture and forestry resources if it would:

A. Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, as shown on the maps prepared pursuant to the California Resources Agency's FMMP, to nonagricultural use;

B. Conflict with existing zoning for agricultural use or Williamson Act contracts;

C. Conflict with existing zoning for or cause rezoning of forest land (as defined in PRC Section 12220[g]), timberland (as defined in PRC Section 4526), or timberland zoned Timberland Production (as defined in Government Code Section 51104[g]);

D. Result in the loss of forest land or conversion of forest land to non-forest use; or

E. Involve other changes in the existing environment that, because of their location or nature, could result in conversion of farmland to nonagricultural use or conversion of forest land to nonforest use.

Environmental Impacts of the Proposed Program

General Cultivation Impacts

Impact AG-1: Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to nonagricultural use. (No Impact)

General cultivation impacts include impacts of any type of cultivation activity: outdoor, mixed-light, indoor, nursery, and processing.

Cannabis cultivation sites under the Proposed Program are anticipated to include locations of farmland, some of which may be designated as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. As discussed above, California law designates cannabis as an agricultural product for Williamson Act purposes. For this reason, cultivation of cannabis on Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, by definition, is an acceptable use of these agricultural land types and would not result in conversion of farmland to nonagricultural use. There would be **no impact**.

Impact AG-2: Convert farmland to cannabis cultivation from other crops. (Less than Significant)

In the course of collecting data for this PEIR, and through the scoping process, concern has been expressed regarding the potential for large-scale cannabis cultivation on land zoned for agricultural use to result in some displacement of food crop cultivation. This trend would be of particular concern because legal cultivation of cannabis would have greater profit margins than more typical agricultural products (Warren 2015), and farmers may find it more profitable to convert existing agricultural cropland to cannabis cultivation. For example, the estimated value of the cannabis grown in Mendocino County ranges from $1.5 billion to $10.5 billion, compared with the entire California grape crop, which is valued at $75.3 million (Reitz 2015). However, at this time, evidence has not been found during preparation of this PEIR to suggest that a substantial displacement of food crop cultivation is likely in California, particularly due to the size limits associated with the various cannabis license types. However, this would be a greater potential concern in areas where agricultural land is scarce in comparison to the demand for cannabis cultivation.

While the issue of crop diversion is an important public policy consideration for cannabis cultivation, conversion of agricultural land from one agricultural product to another is not considered a significant impact under CEQA. Therefore, this impact would be **less than significant**.

Impact AG-3: Potential conflict with existing zoning for agricultural use or Williamson Act contract. (Less than Significant)

Under the Proposed Program, the issuance of licenses would be contingent upon cannabis cultivation operations being compliant with local jurisdiction requirements, including zoning ordinances. It is expected that CDOC and local jurisdictions (cities and counties) would work together to determine if cannabis cultivation is permitted within land under a Williamson Act Contract.

Generally, cannabis cultivation would either be allowed within land under a Williamson Act contract, or would not be allowed in locations where it has been determined that cannabis cultivation is not permitted under a Williamson Act contract. All cultivators would be required to follow applicable guidance in order to remain licensed by CDFA. For these reasons, potential conflicts with existing zoning for agricultural use or Williamson Act contracts would be **less than significant**.

Impact AG-4: Conflict with existing zoning for, or cause rezoning of, forest land, timberland, or timberland zoned for timberland production. (Less than Significant)

As discussed in Section 4.2.3, "Environmental Setting," under the heading "Cannabis Cultivation Within Forests," studies conducted in Mendocino County and Humboldt County have documented the past conversion of forest land to cannabis cultivation activities, which may have resulted in conflicts with zoning for forest land or timberland.

Under the Proposed Program, applicants would be required to comply with local requirements including zoning districts designated for forest land and timberland. While site development is outside of the scope of the Proposed Program, applicants and owners of nonfederal timberland would be required to apply for either a Timberland Conversion Permit from CAL FIRE for the conversion of timberland greater than 3 acres to develop a site for cannabis cultivation uses, or an exemption for the conversion of timberland less than 3 acres.

For these reasons, this impact would be **less than significant**.

Impact AG-5: Cause loss of forestland or conversion of forestland to nonforest uses. (Less than Significant)

As previously discussed in Section 4.2.3, "Environmental Setting," and in Impact AG-4, several studies have indicated that outdoor cannabis cultivation has resulted in conversion of forest land to such uses and is a particular concern in northern California where loss of forest land could result in associated adverse effects on species that rely on such habitats.

However, loss or conversion of forestland to nonforest uses related to development of cannabis cultivation sites would be outside the scope of the Proposed Program, which does not include approvals for site development activities. Land conversion as part of site development is evaluated as a separate but related activity in the cumulative impact analysis contained in Chapter 6, *Cumulative Considerations*. Loss of forest land and conversion of forestland to nonforest uses from cultivation activities would therefore be **less than significant**.

Impact AG-6: Involve other changes in the existing environment that, because of their location or nature, could result in conversion of farmland to nonagricultural use or conversion of forest land to nonforest use. (Less than Significant)

The Proposed Program could result in indirect effects related to converting farmland to nonagricultural uses or converting forest land to nonforest uses. For example, depending on how and where cannabis cultivation operations obtain water supplies, the Proposed Program could reduce the water supply for other farmers from growing crops on agricultural lands that rely on the same water source. In this scenario, there is a possibility that farmland could be converted to nonagricultural uses.

However, for surface water diversions, the SWRCB through its water rights process would require that the cultivator's diversions do not unreasonably affect other legal users of water. This would prevent such an impact from arising due to the direct use of surface water. For cultivators obtaining surface water supplies from other water purveyors (e.g., municipal water systems, water trucks), the purveyors would be required to comply with the same requirements, avoiding the potential for a significant impact.

The issue is potentially of more concern with respect to groundwater, which is not subject to the same water rights process. Overuse of groundwater resources could lead to impacts such as basin overdraft or well interference. However, no information has been found during the preparation of this PEIR to suggest that use of groundwater for cannabis cultivation has resulted in such an impact on the water supply of other farmers. The extent to which this impact could arise as a result of the Proposed Program is unknown and would

be based on site-specific circumstances. Therefore, this impact is considered speculative and is not considered further.

Another indirect effect related to cannabis cultivation would be the development at cultivation sites of facilities not related to cultivation, such as residences, which could result in conversion of farmland or forestland. However, similar to development of the cultivation sites themselves, these activities would be outside the scope of the Proposed Program, which does not include approvals for site development activities. Any site-specific impacts must be determined by the local authority reviewing the action. Such land conversion is evaluated as a separate but related activity in the cumulative impact analysis contained in Chapter 6, *Cumulative Considerations*.

For these reasons, the Proposed Program would not involve other changes in the existing environment that, because of their location or nature, could result in conversion of farmland to nonagricultural use or conversion of forest land to nonforest use. This impact would be **less than significant.**

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4.3 Air Quality

4.3.1 Introduction

This section of the Program Environmental Impact Report (PEIR) for the California Department of Food and Agriculture's (CDFA's) CalCannabis Cultivation Licensing program (Proposed Program) presents the environmental setting and potential impacts of the Proposed Program related to air quality. Greenhouse gas emissions from the Proposed Program are discussed in Section 4.6, *Energy Use and Greenhouse Gas Emissions.*

Information regarding air quality presented in this section is primarily based on the following sources:

- Publicly available literature on cannabis cultivation methods and equipment needs;
- Site visits of existing medical cannabis cultivation operations;
- Available data from the California Air Resources Board (CARB) and the U.S. Environmental Protection Agency (USEPA) on existing air quality conditions in California and relevant regulations;
- *Human Health and Ecological Screening Risk Evaluation* (**Appendix F** of this Draft PEIR); and
- *Standardized Regulatory Impact Assessment of Medical Cannabis Cultivation Program Regulations* (SRIA) (ERA Economics 2017).

4.3.2 Regulatory Setting

Federal Laws, Regulations, and Standards

Clean Air Act

The federal Clean Air Act (CAA) and the 1990 CAA Amendments govern air quality in the United States and are administered by USEPA. The CAA authorizes USEPA to set limits on the concentrations in the air of certain air pollutants and grants it the authority to place limits on emission sources. USEPA implements a variety of programs under the CAA that focus on reducing ambient air concentrations of pollutants that cause smog, haze, acid rain, and serious health effects and on phasing out ozone-depleting chemicals.

National Ambient Air Quality Standards

As required by the CAA, USEPA has established National Ambient Air Quality Standards (NAAQS) for six major air pollutants. These pollutants, known as criteria air pollutants, are ozone (O_3); particulate matter (PM), specifically PM_{10} (PM with aerodynamic radius of 10 micrometers or less) and $PM_{2.5}$ (PM with aerodynamic radius of 2.5 micrometers or less); carbon monoxide (CO); nitrogen dioxide (NO_2); sulfur dioxide (SO_2); and lead. California also has established ambient air quality standards, known as the California Ambient Air Quality Standards (CAAQS), which generally are more stringent than the corresponding federal standards and incorporate additional standards for sulfates, hydrogen sulfide (H2S),

vinyl chloride, and visibility-reducing particles. CAAQS are discussed in more detail below in "State Laws, Ordinances, Regulations, and Standards."

The federal and state standards for criteria air pollutants are shown in Table 4.3-1. The primary standards have been established to protect public health. The secondary standards are intended to protect the nation's welfare and account for air pollutant impacts on soil, water, visibility, materials, vegetation, and other aspects of the general welfare.

A basic measure of air quality is whether an air basin is meeting the NAAQS and CAAQS. Areas that do not exceed these standards are designated as being in attainment, areas that exceed these standards are designated as nonattainment areas, and areas for which insufficient data are available to make a determination are designated unclassified. As part of its enforcement responsibilities, USEPA requires each state with nonattainment areas (NAAs) to prepare and submit a State Implementation Plan (SIP) that demonstrates the means by which it will attain the federal standards, and requires that a maintenance plan be prepared for each former NAA for which the state subsequently has demonstrated attainment of the standards. The SIP must integrate federal, state, and local plan components and regulations to identify specific measures to reduce pollution, using a combination of performance standards and market-based programs, within the time frame identified in the SIP.

National Emission Standards for Hazardous Air Pollutants

The National Emission Standards for Hazardous Air Pollutants are standards for major sources of hazardous air pollutants (HAPs). The standards are contained in two parts of Title 40 of the Code of Federal Regulations (CFR): Part 61, promulgated before the 1990 CAA Amendments, and Part 63, promulgated as part of the CAA Amendments in 1990. Part 61 regulates seven HAPs: asbestos, beryllium, mercury, vinyl chloride, benzene, arsenic, and radon/radionuclides. Part 63 establishes a list of 187 additional HAPs. The maximum achievable control technology standards of 40 CFR Part 63 regulate major sources of HAPs as well as certain specific source categories of HAPs. A major source is defined as a source having the potential to emit 10 tons per year of a single HAP or 25 tons per year of a combination of HAPs. The Proposed Program would not fall under any of the specific source categories identified in the standards.

Corporate Average Fuel Economy Standards

The Corporate Average Fuel Economy (CAFE) standards, which were first enacted by Congress in 1975, require vehicle manufacturers to comply with federally established gas mileage or fuel economy standards. These standards are set and regulated by the National Highway Traffic Safety Administration (NHTSA), with testing and data support from USEPA.

The issued rules include fuel economy standards for both light- and heavy-duty vehicles. On September 15, 2011, USEPA and NHTSA issued a final rule on greenhouse gas (GHG) emission standards and fuel efficiency standards for medium- and heavy-duty engines and vehicles model years 2014-2018 (76 Federal Register [FR] 57106). On August 28, 2012, USEPA and NHTSA issued a joint final rulemaking to establish 2017-2025 GHG emission and CAFE standards for light-duty vehicles (77 FR 62624). In March 2017, USEPA announced that the CAFE standards would be revisited as part of a mid-term evaluation to determine whether the 2022-2025 standards are appropriate (USEPA 2017). A decision would be required by April 2018 (USEPA 2017).

Table 4.3-1. State and Federal Ambient Air Quality Standards

Contaminant	Averaging Time	State Standards[1]	Federal Primary Standards[2]	Federal Secondary Standards
Ozone (O_3)	1-hour	0.09 ppm	See footnote 3	—
	8-hour	0.070 ppm	0.070 ppm [3]	Same as primary
Carbon Monoxide (CO)	1-hour	20 ppm	35 ppm	—
	8-hour	9.0 ppm	9.0 ppm	—
Nitrogen Dioxide (NO_2)	1-hour	0.18 ppm	0.100 ppm[4]	—
	Annual arithmetic mean	0.030 ppm	0.053 ppm	Same as primary
Sulfur Dioxide (SO_2)	1-hour	0.25 ppm	0.075 ppm	0.5 ppm[7]
	24-hour	0.04 ppm	0.14 ppm	—
	Annual arithmetic mean	—	0.030 ppm	—
Particulate Matter (PM_{10})	24-hour	50 µg/m^3	150 µg/m^3	Same as primary
	Annual arithmetic mean	20 µg/m^3	—	—
Fine Particulate Matter ($PM_{2.5}$)	24-hour	—	35 µg/m^3	Same as primary
	Annual arithmetic mean	12 µg/m^3	12 µg/m^3	15 µg/m^3
Sulfates	24-hour	25 µg/m^3	—	—
Lead[5]	30-day average	1.5 µg/m^3	—	—
	Calendar quarter	—	1.5 µg/m^3	—
	Rolling 3-month average	—	0.15 µg/m^3	Same as primary
Hydrogen Sulfide (H_2S)	1-hour	0.03 ppm	—	—
Vinyl Chloride[5] (chloroethene)	24-hour	0.010 ppm	—	—
Visibility-reducing Particles	8 hour (10:00 to 18:00 PST)	*See footnote 6*	—	—

Notes: ppm = parts per million; USEPA = U.S. Environmental Protection Agency; µg/m^3 = micrograms per cubic meter

[1] California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, suspended particulate matter – PM10, and visibility-reducing particles are

values that are not to be exceeded. The standards for sulfates, Lake Tahoe carbon monoxide, lead, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded. If the standard is for a 1-hour, 8-hour, or 24-hour average (i.e., all standards except for lead and the PM_{10} annual standard), then some measurements may be excluded. In particular, measurements are excluded that CARB determines would occur less than once per year on the average. The Lake Tahoe carbon monoxide standard is 6.0 ppm, one-half the national standard and two-thirds the state standard.

[2] National standards shown are the primary standards designed to protect public health. National air quality standards are set by USEPA at levels determined to be protective of public health with an adequate margin of safety. National standards other than for ozone, particulates, and those based on annual averages are not to be exceeded more than once per year. The 1-hour ozone standard is attained if, during the most recent three-year period, the average number of days per year with maximum hourly concentrations above the standard is equal to or less than one. The 8-hour ozone standard is attained when the three-year average of the 4th highest daily concentrations is 0.075 ppm (75 parts per billion) or less. The 24-hour PM_{10} standard is attained when the three-year average of the 99th percentile of monitored concentrations is less than 150 $\mu g/m^3$. The 24-hour $PM_{2.5}$ standard is attained when the three-year average of 98th percentiles is less than 35 $\mu g/m^3$. Except for the national particulate standards, annual standards are met if the annual average falls below the standard at every site. The national annual particulate standard for PM_{10} is met if the three-year average falls below the standard at every site. The annual $PM_{2.5}$ standard is met if the three-year average of annual averages spatially averaged across officially designed clusters of sites falls below the standard.

[3] The national 1-hour ozone standard was revoked by USEPA on June 15, 2005. On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm. However, the attainment status has not yet been updated based on this revised 8-hour standard. It is likely that the region will remain in nonattainment.

[4] To attain this standard, the three-year average of the 98th percentile of the daily maximum 1-hour average at each monitoring station within an area must not exceed 0.100 ppm (effective January 22, 2010).

[5] CARB has identified lead and vinyl chloride as toxic air contaminants with no threshold level of exposure below which there are no adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

[6] Statewide Visibility-Reducing Particle Standard (except Lake Tahoe Air Basin): Particles in sufficient amount to produce an extinction coefficient of 0.23 per kilometer when the relative humidity is less than 70 percent. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range.

[7] The secondary standard is for a 3-hour averaging time and should not be exceeded more than once per year.

Sources: CARB 2016a, USEPA 2016

Nonroad Emission Regulations

USEPA has adopted emission standards for different types of nonroad engines, equipment, and vehicles. For nonroad diesel engines, USEPA has adopted multiple tiers of emission standards.

USEPA signed a final rule on May 11, 2004, introducing the Tier 4 emission standards, to be phased in between 2008 and 2015 (40 CFR Parts 9, 69, et al., Control of Emissions of Air Pollution from Nonroad Diesel Engines and Fuel; Final Rule, June 29, 2004). The Tier 4 standards require that emissions of PM and nitrogen oxides (NO_X) be further reduced by about 90 percent. Such emission reductions can be achieved through the use of control

technologies, including advanced exhaust gas after-treatment. To enable sulfur-sensitive control technologies in Tier 4 engines, such as catalytic particulate filters and NO_X absorbers, USEPA also mandated reductions in sulfur content in nonroad diesel fuels. In most cases, federal nonroad regulations also apply in California, which has only limited authority to set emission standards for new nonroad engines. The CAA preempts California's authority to control emissions from new farm and construction equipment of less than 175 horsepower (CAA Section 209[e][1][A]) and requires California to receive authorization from USEPA for controls over other off-road sources (CAA Section 209[e][2][A]).

State Laws, Ordinances, Regulations, and Standards

California Clean Air Act and California Ambient Air Quality Standards

The State of California initiated its own air quality standards, the CAAQS, in 1969 under the mandate of the Mulford-Carrell Act. The CAAQS are goals for air quality within the state. The CAAQS generally are more stringent than the NAAQS. In addition to the six criteria pollutants covered by the NAAQS, CAAQS also regulate sulfates, H_2S, vinyl chloride, and visibility-reducing particles. These standards are listed in **Table 4.3-1**.

The California Clean Air Act (CCAA), enacted in 1988, provides a comprehensive framework for air quality planning. The CCAA requires NAAs to achieve and maintain the health-based CAAQS by the earliest practicable date. The CCAA is administered by CARB at the State level and by local air districts at the regional level; the air districts are required to develop plans and control programs for attaining State standards.

The CCAA requires NAAs in the state to prepare attainment plans, which are required to achieve a minimum 5 percent annual reduction in the emissions of nonattainment pollutants unless all feasible measures have been implemented. All air basins in California are either unclassified or in attainment of the NAAQS and CAAQS for CO, SO_2, and NO_2. Some air basins are classified as NAAs for the NAAQS and CAAQS for O_3, PM_{10}, and $PM_{2.5}$. In addition, a few air basins have been classified as nonattainment for H_2S under the CAAQS. A portion of the South Coast Air Basin in Los Angeles County is designated as an NAA for the NAAQS for lead, while all other air basins are in attainment for the lead-related NAAQS and CAAQS.

CARB is responsible for ensuring implementation of the CCAA, meeting State requirements for the federal CAA, and establishing the CAAQS. CARB oversees activities of local air districts and is responsible for incorporating air quality management plans for local air basins into a SIP for USEPA approval. It also is responsible for setting emission standards for vehicles sold in California and for other emission sources, such as consumer products and certain off-road equipment. CARB also establishes passenger vehicle fuel specifications.

Truck and Bus Regulation

On December 12, 2008, CARB approved a new regulation to substantially reduce emissions of diesel PM, NO_X, and other pollutants from existing on-road diesel vehicles operating in California. The regulation requires affected trucks and buses to meet performance standards and requirements between 2011 and 2023. Affected vehicles include on-road, heavy-duty, diesel-fueled vehicles with a gross vehicle weight rating great than 14,000

pounds. The regulation was updated in 2011 to provide more compliance flexibility and reflect the impact of the economic recession on vehicle activity and emissions.

Commercial Vehicle Idling Regulation

On October 20, 2005, CARB approved an Airborne Toxic Control Measure (ATCM) to limit idling of diesel-fueled commercial motor vehicles. This regulation was a follow-up to previous idling ATCMs, and it consists of new engine and in-use truck requirements, as well as idling emission performance standards. The regulation requires heavy-duty diesel engines of model years 2008 and newer to be equipped with a non-programmable system that automatically shuts down the engine after 5 minutes of idling or, optionally, meets a stringent NO_X idling emission standard (30 grams per hour) (CARB 2008). The regulation also is applicable to the operation of in-use trucks, requiring operators of both in-state and out-of-state registered, sleeper berth–equipped trucks to manually shut down their engines when idling more than 5 minutes at any location within California, beginning in 2008. Affected vehicles include diesel-fueled commercial vehicles with a gross vehicle weight rating greater than 10,000 pounds.

Heavy-duty On-board Diagnostic System Regulations

In 2004, CARB adopted a regulation requiring on-board diagnostic (OBD) systems on all heavy-duty engines and vehicles (i.e., gross vehicle weight rating greater than 14,000 pounds) of model year 2007 and later in California. CARB subsequently adopted a comprehensive on-board diagnostic regulation for heavy-duty vehicles of model years 2010 and later. The heavy-duty OBD regulation was updated in 2010, 2013, and 2016 with revisions to enforcement requirements, testing requirements, and implementation schedules.

Heavy-duty Vehicle Inspection Program

CARB's heavy-duty vehicle inspection program requires heavy-duty trucks and buses to be inspected for excessive smoke and tampering and for engine certification label compliance. Any heavy-duty vehicle (i.e., gross vehicle weight rating greater than 6,000 pounds) traveling in California, including vehicles registered in other states and foreign countries, may be tested. Tests are performed by CARB inspection teams at border crossings, California Highway Patrol weigh stations, fleet facilities, and randomly selected roadside locations. Owners of trucks and buses found in violation are subject to penalties starting at $300 per violation.

California Standards for Diesel Fuel Regulations

California regulations require that diesel fuel with sulfur content of 15 parts per million (ppm) or less (by weight) be used for all diesel-fueled vehicles that are operated in California. The standard also applies to non-vehicular diesel fuel, other than diesel fuel used solely in locomotives or marine vessels. The regulations also contain standards for the aromatic hydrocarbon content and lubricity of diesel fuels.

In-use Off-road Diesel Vehicle Regulation

In 2007, CARB adopted a regulation to reduce diesel PM and NO_X emissions from in-use, off-road, heavy-duty diesel vehicles in California. The regulation imposes limits on vehicle

idling and requires fleets to reduce emissions by retiring, replacing, repowering, or installing exhaust retrofits to older engines. In December 2010, major amendments were made to the regulation, including a delay of the first performance standard compliance date to no earlier than January 1, 2014 (CARB 2011, 2016). Personal-use vehicles and vehicles used solely for agriculture are exempt from this regulation (CARB 2016).

Assembly Bill 1803

In 1983, the California State Legislature enacted Assembly Bill 1803, establishing a two-step process of risk identification and risk management to address the potential health effects from airborne toxic substances and protect public health. In the first step (identification), CARB and the California Office of Environmental Health Hazard Assessment (OEHHA) determine whether a substance needs to be formally identified as a toxic air contaminant (TAC) in California. In the second step (management), CARB reviews the emission sources of an identified TAC to determine whether any regulatory action is necessary to reduce the risk. The analysis includes a review of controls already in place, the available technologies and associated costs for reducing emissions, and the associated risk. Public outreach is an essential element in the development of a control plan and any control measures, so that CARB's efforts are cost-effective and appropriately balance public health protection and economic growth.

Using this process, CARB has adopted several ATCMs to reduce exposure to TACs. This includes several measures and controls to limit exposure of diesel PM by limiting vehicle idling and limiting the emission rate of engines through engine or exhaust control technologies. Other ATCMs are aimed at reducing exposure to several other sources of TACs, including benzene from retail service stations; hexavalent chromium from plating facilities and vehicle coatings; asbestos from construction, grading, quarrying, surface mining operations, and surfacing applications; formaldehyde from composite wood products; various TACs associated with combustion sources; ethylene oxide from sterilizers and aerators; perchloroethylene from dry cleaning; and TACs from thermal spraying, cooling towers, nonferrous metal mining, and automotive maintenance and repair.

Portable Engine Airborne Toxic Control Measure

The California Portable Engine ATCM is designed to reduce the PM emissions from portable diesel-fueled engines rated at 50 brake horsepower or larger. Some cultivators are likely to use generators of this size, and this ATCM would apply to them.

Portable Equipment Registration Program

The statewide Portable Equipment Registration Program (PERP) establishes a system to uniformly regulate portable engines and portable engine–driven equipment units. After being registered in this program, engines and equipment units may operate throughout the state without the need to obtain separate permits from individual air districts. Owners or operators of portable engines and certain types of equipment can voluntarily register their units to operate their equipment anywhere in the state. Operation of registered portable engines still may be subject to certain district requirements for reporting and notification. Engines with less than 50 brake horsepower are exempt from this program.

California Toxic Air Contaminant Act

Under the California Toxic Air Contaminant Act, the California Department of Pesticide Regulation (CDPR) is responsible for evaluating pesticide use of chemicals as TACs. CDPR lists pesticides that have been previously identified under federal laws as HAPs and pesticides identified as TACs by CDPR through the TAC statute evaluation process. The list contains 38 HAPs, as well as eight pesticides identified by CDPR through the TAC evaluation process.

California Department of Pesticide Regulation Air Program Activities

As described previously, the federal CAA requires each state to submit a SIP for achieving and maintaining the NAAQS, including the standard for O_3. NAAs are regions in California that do not meet either NAAQS or CAAQS. CARB and CDPR have developed a plan to track and reduce pesticide sources of volatile organic compounds (VOCs) in NAAs as part of the California SIP to meet the O_3 standard. CDPR is responsible for regulating agricultural and commercial structural pesticide products, and CARB is responsible for regulating pesticides in consumer products. CDPR, in collaboration with CARB, implements several activities related to air monitoring, evaluating health risk of pesticides in air, mitigating and controlling health risks of pesticides, and tracking and reducing pesticide VOC emissions.

Regional Laws, Plans, Policies, and Regulations

CARB has divided the state into 15 air basins, which are managed by 35 air districts. These air basins may be under the jurisdiction of more than one district. Air districts have substantial authority regarding air quality control, in regulating stationary source emissions and developing local attainment plans.

A discussion of applicable district rules and regulations is provided below. Summaries of general regulatory areas are presented with examples from selected districts. The specific rules cited below represent a large sample of districts throughout the state; however, because of their large number, not all applicable rules and regulations of all districts have been included. Further information on all district rules and regulations is available in CARB's District Rules database (CARB 2016b).

Portable Equipment Regulations

Many districts have adopted rules that require portable equipment to be registered with the district. Each air district may have different definitions of portable engines, based on the type of activity or duration of operation. These portable equipment rules generally contain registration protocols, source category standards (emission standards for pollutants such as NO_X, CO, VOCs, and PM), testing requirements, and reporting and recordkeeping requirements. These rules include San Joaquin Valley Air Pollution Control District (SJVAPCD) Rule 2280, Yolo-Solano Air Quality Management District (YSAQMD) Rule 3.3, San Diego County Air Pollution Control District (APCD) Rule 12.1, and Northern Sierra Air Quality Management District (AQMD) Rule 523.

Other districts may require operators of portable equipment to obtain permits to operate. Under these rules, portable engines may be subject to emission standards, administrative requirements, and monitoring and reporting requirements. These rules include South Coast Air Quality Management District (SCAQMD) Rule 203, Bay Area Air Quality Management

District (BAAQMD) Regulation 2–Rule 1, Sacramento Metropolitan Air Quality Management District (SMAQMD) Rule 201, Santa Barbara County APCD Rule 201, Ventura County APCD Rule 10, San Luis Obispo County APCD Rule 202, Mojave Desert AQMD Rule 203, Imperial County APCD Rule 201, Monterey Bay Unified APCD Rule 200, and Mendocino County AQMD Rule 1-200.

In addition, districts may adopt permitting and registration rules that specifically apply to equipment used in agricultural operations. These rules include YSAQMD Rule 11.3, SMAQMD Rule 215, Santa Barbara County APCD Rule 1201, Ventura County APCD Rule 250, San Luis Obispo County APCD Rule 250, Mojave Desert AQMD Rule 1160.1, and Monterey Bay Unified APCD Rule 220.

As stated previously, the statewide PERP allows portable units to be registered and then operate anywhere within the state. Portable engines registered with PERP are exempt from district registration and permitting requirements, although certain district requirements for reporting and notification of operation may still apply.

Odor Regulations

In general, odor regulations fall into two categories: (1) they are covered through a general nuisance regulation or (2) they are covered under a separate air district rule. Nuisance regulations are described in the "Nuisance" section below while odor-specific rules are described here.

California Health and Safety Code Section 41700 prohibits discharge of air contaminants, including odors, that cause nuisance or annoyance to the public; however, odors related to agricultural operations are exempt (Section 41704). The exemption for odors from agricultural operations is repeated in rules by many air districts that have established odor-specific rules, including Mendocino County AQMD Rule1-400, SJVAPCD Rule 4102, Mojave Desert AQMD Rule 402, and SCAQMD Rule 402. Other air district rules, such as the North Coast Unified AQMD Rule 104, solely include odor regulations related to specific activities, such as rendering.

Nuisance Regulations

Nuisance is generally defined in air regulations as those discharges that cause annoyance or endanger the comfort, repose, or health of the public. Rules regarding nuisance air contaminants and emissions may limit the emissions from various sources. Exemptions for agricultural operations exist in many district rules, including Mendocino County AQMD Rule 1-400, SJVAPCD Rule 4102, San Diego County APCD Rule 51, Mojave Desert AQMD Rule 402, SCAQMD Rule 402, SMAQMD Rule 402, SLOCAPCD Rule 402, MBUAPCD Rule 402, Northern Sierra AQMD Rule II-205, and YSAQMD Rule II-2.5. However, some air districts either do not provide exemptions for agricultural operations in their nuisance rules (e.g., Santa Barbara County APCD Rule 303), or they do not have rules specific to nuisance air pollution emissions, other than burning (i.e., the North Coast Unified AQMD Rule 201).

Fugitive Dust Regulations

Rules regarding fugitive dust (i.e., PM in the air) aim to prevent, reduce, or mitigate fugitive dust emissions from agriculture and other anthropogenic sources. The North Coast Unified AQMD Rule 104 requires that reasonable precautions be taken to prevent particulate

matter from becoming airborne, including conducting agricultural practices in a manner that minimizes the creation of airborne dust and covering open-bodied trucks used for transporting materials likely to create airborne dust. These requirements are similar to those stated in Mendocino County AQMD Rule 1-430. The SJVAPCD and the Santa Barbara County APCD addresses fugitive dust only in the context of PM10 and/or fugitive dust from construction and demolition activities. Mojave Desert AQMD Rule 403 and the SMAQMD Rule 403 exempt agricultural operations from fugitive dust regulations. Other districts do not exempt agriculture, such as San Diego County APCD Rule 54 and SCAQMD 403.

Agricultural/Open Burning Regulations

Air districts have established a variety of rules regulating the burning of vegetative agricultural materials generated by agricultural operations, including establishing requirements related to the type of incinerator or other equipment used to burn the waste, restricting burning to specific burn days based on air quality forecasts and observations, requiring permits from the air districts, and limiting burning to specific types of waste or limited quantities. The North Coast Unified AQMD has specific incinerator equipment requirements (Rule 104), and requires that a non-standard burn permit be obtained for open outdoor fires used in agricultural operations (Rule 201). The YSAQMD's Regulation VI establishes a variety of rules related to agricultural burning, including prohibitions, burn permits, restricted burning days, fire prevention, and specific rules regarding the burning of empty sacks or containers that contained pesticides or other toxic substances. Other air districts statewide have established similar agricultural burning regulations as those described above and include but are not limited to: Mendocino County AQMD Rule 2-300, SJVAPCD Rule 4103, San Diego County APCD Rule VI-101, Monterey Bay Unified APCD Rule 438, Mojave Desert AQMD Rule 444, SMAQMD Rule 501, and the SCAMQD Rule 444. The Santa Barbara County APCD is one of the few agricultural burning rules that directly discusses/allows the burning of confiscated cannabis (Rule 312).

Solvent Regulations

Some districts have adopted rules to limit emissions of VOCs from the use of organic solvents and other organic materials. These rules may contain VOC emissions limits, control measures, reduction standards, and testing or monitoring requirements. In several districts, the application of pesticides is exempt under these rules. These rules include SJVAPCD Rule 4661, SCAQMD Rule 442, YSAQMD Rule 2.13, SMAQMD Rule 441, Santa Barbara County APCD Rule 317, San Diego County APCD Rule 66.1, San Luis Obispo County AQMD Rule 407, Mojave Desert AQMD Rule 442, Imperial County APCD Rule 417, and Monterey Bay Unified APCD Rule 416.

Rules in some districts may not contain exemptions for these operations. For example, BAAQMD Regulation 8–Rule 2 regarding organic compound emissions from miscellaneous operations contains an emissions limit of 6.8 kilograms (15 pounds) per day for materials with a concentration of more than 300 ppm total carbon on a dry basis. BAAQMD does not exempt pesticides from this rule.

Visible Emission Regulations

Rules regarding visible emissions may limit the duration, volume, or opacity of emissions from various sources. Exemptions for agricultural operations or pesticide spraying exist in certain district rules, including SJVAPCD Rule 4101, SCAQMD Rule 401, YSAQMD Rule 2.3,

SMAQMD Rule 401, Santa Barbara County APCD Rule 302, San Diego County APCD Rule 50, San Luis Obispo County AQMD Rule 401, Monterey Bay Unified APCD Rule 400, and Mendocino County AQMD Rule 1-410. Other visible emission rules, such as BAAQMD Regulation 6, Mojave Desert AQMD Rule 401, and Northern Sierra AQMD Rule 202, may not provide these exemptions.

Local Laws, Plans, Policies, and Regulations

Local General Plans

Many city and county general plans contain goals, policies, and strategies related to air quality and air pollutant emissions. Applicable policies and strategies from these general plans include encouraging the use of alternative fuels, limiting idling time of vehicles and equipment, recommending appropriate practices for agriculture operations and construction, and encouraging the installation of emission control devices.

Local Odor Controls

Counties and cities frequently have nuisance provisions in their local zoning and public health codes to control the generation of objectionable odors and the proximity of objectionable odors to local sensitive receptors.

Local Cannabis Ordinances

Numerous counties and some cities have adopted or are considering adopting cannabis cultivation ordinances. Some of these ordinances contain provisions for cultivators to prevent airborne odors, and some mandate specific methods (e.g., air filtration or air scrubbers) to attain that objective. Many ordinances rely upon more qualitative standards and stipulate that cultivation activities must not adversely affect the environment or public health, safety, or general welfare by creating dust, smoke, noxious gases, or odors, as indicated in Appendix E, *Summary of Existing and Proposed Local Commercial Cannabis Cultivation Regulations*.

4.3.3 Environmental Setting

The following discussion describes the location, meteorology and climate, criteria air pollutants and potential health impacts, TACs and potential health impacts, and existing air quality relevant to the Proposed Program.

Proposed Program Location

California is divided into 15 air basins that are managed by 35 air districts, with responsibility for attaining and maintaining air quality within the state. The extent of each activity under the Proposed Program would vary throughout the air basins and would have the potential for varying air emissions. Air basins also are dissimilar in their ambient air quality and emissions standards. The existing air quality of each air basin and subregion is described in "Existing Air Quality" below.

Meteorology and Climate

As the CalCannabis Cultivation Licensing program would be effective statewide, the meteorology and climate for the state are characterized very generally in this PEIR. Because it is such a large area, California has substantial variability in climate, depending on specific locations within the state. Latitude, elevation, and proximity to the coast are the primary factors influencing specific climates. The following information on climate and meteorology was obtained from the Western Regional Climate Center (2016).

California extends between 32.5° and 42° north latitude and has an extensive coastline along the Pacific Ocean. The Coast Ranges in the west merge with the Cascade Range in northern California. The Cascades then extend southeastward until they merge into the Sierra Nevada. The Sierra Nevada, which parallels the coast, is located up to 150 miles farther inland. The Central Valley is a broad, flat valley between the Coast Ranges and the Sierra Nevada. The southern end of the Central Valley is closed off by the southern Sierra Nevada, joining the Tehachapi Mountains, which bend southwestward to join the Coast Ranges. Furthermore, a series of ranges continues southeastward to the southern border of California, from the point where the Tehachapi Mountains and the Coast Ranges join. This wide-ranging topography creates a variety of climates in the state.

In addition, the Eastern Pacific High, which is a strong, persistent area of high atmospheric pressure over the Pacific Ocean, is the major influence on regional climate. The Eastern Pacific High moves northward in summer, attaining its greatest strength and keeping away storm tracks. Therefore, California receives little or no precipitation from this source during that period. In winter, the Eastern Pacific High often retreats southward and decreases in intensity, allowing storm centers to swing into and across California. These storms bring widespread, moderate precipitation to the state.

The coastal and southern regions of California have a predominantly Mediterranean climate that is characterized by warm to hot, dry summers and cool, wet winters. The presence of the Pacific Ocean helps to moderate temperatures. The northern coastal area of California is characterized as having more of a maritime climate, with narrower temperature ranges and heavier rainfall. Warm winters, cool summers, small daily and seasonal temperature variation, and high relative humidity are characteristic of this area. A more continental climate is experienced further inland, resulting in wider temperature ranges during the year. The Coast Ranges form a barrier to the west, keeping the interior from the strong flow of air off the Pacific Ocean. Therefore, farther to the east, winters are colder, summers are warmer, and precipitation is relatively greater on the coastal or western side of the major mountain ranges. The low-lying inland valleys, in particular the Central Valley, normally have subtropical temperatures with a dry summer season and a cool and foggy rainy season, similar to a hot Mediterranean climate. The desert regime east of the mountain ranges in southeastern California experiences a low relative humidity and high temperatures during the summer. Death Valley and the Mojave Desert are the hottest parts of California.

Because the dispersion of air pollutants is strongly associated with wind speed and wind direction, the general wind pattern in California also is important. California lies within the zone of westerly prevailing winds along with a high-pressure area over the northeast Pacific Ocean on the east side. The wind generally blows from the west or northwest during most of the year. Because of the state's mountain ranges, however, wind direction can be

deflected and often is more a product of local terrain than of this prevailing westward circulation. In the Sacramento and San Joaquin Valleys, winds come from the north, caused by the compressed heating of air flowing out of the Great Basin, which creates pronounced heat waves in summer. In winter, the result usually is a rather mild temperature, accompanied by a dry, persistent wind. The Central Valley and the Southeastern Desert Basin experience a typical northwest wind in summer, reinforced by the dynamics of the thermal low-pressure area that is located over these areas. The Santa Ana wind flows out of the Great Basin into the Central Valley, the Southeastern Desert Basin, and the South Coast. The air in these areas typically is very dry. The winds are strong and gusty, particularly near the mouth of canyons that are oriented in the direction of the airflow. In the San Francisco Bay area, a diurnal wind pattern (offshore at night and onshore during the day) helps to carry locally produced air pollutants away from the Bay Area but creates problems for the regions immediately south and east of the source area. In the Los Angeles area, the basin is almost completely surrounded by mountains on the north and east. Coupled with the atmospheric inversion[1] layer, this topography causes a fairly regular diurnal daily wind pattern that tends to cause an accumulation of air pollutants in the basin.

Criteria Air Pollutants and Potential Health Impacts

Seven common criteria air pollutants are known to cause harm to human and environmental health. Ambient air concentration levels of criteria air pollutants are one metric used as an indicator of ambient air quality. A brief description of each criteria air pollutant and its adverse health effects is presented below.

Ozone

O_3 is formed by photochemical reactions between NO_X and reactive organic gases (ROGs) in the presence of sunlight rather than being directly emitted. O_3 is a pungent, colorless gas that is a component of smog. Elevated O_3 concentrations can result in reduced lung function, particularly during vigorous physical activity. This health problem can be particularly acute in sensitive receptors such as the sick, seniors, and children. O_3 levels peak during the summer and early fall months.

Carbon Monoxide

CO is formed by the incomplete combustion of fossil fuels, almost entirely from automobiles. It is a colorless, odorless gas that can cause dizziness, fatigue, and impairment to central nervous system functions. CO passes through the lungs into the bloodstream, where it interferes with the transfer of oxygen to body tissues.

Nitrogen Oxides

NO_X contributes to other pollution problems, including a high concentration of fine PM, poor visibility, and acid deposition. Nitrogen dioxide (NO_2), a reddish-brown gas, and nitric oxide, a colorless, odorless gas, are formed from fuel combustion under high temperature or

[1] Atmospheric inversions are horizontal layers of air that increase in temperature with height. Such warm, light air often lies over air that is cooler and heavier. As a result, the air has a strong vertical stability, especially in the absence of strong winds (Environmental Encyclopedia 2003).

pressure. These compounds are referred to collectively as NO_X. NO_X is a primary component of the photochemical smog reaction. NO_2 can decrease lung function and may reduce resistance to infection.

Sulfur Dioxide

SO_2 is a colorless, irritating gas formed primarily from incomplete combustion of fuels containing sulfur. Industrial facilities also contribute to gaseous SO_2 levels in California. SO_2 irritates the respiratory tract, can injure lung tissue when combined with fine PM, and reduces visibility and the level of sunlight.

Reactive Organic Gases

ROGs are formed from combustion of fuels and evaporation of organic solvents. ROGs are the fraction of VOCs that are a prime component of the photochemical smog reaction. Individual ROGs can be TACs.

Particulate Matter

PM is the term used for a mixture of solid particles and liquid droplets suspended in the air. PM ranges from particles that can be seen with the naked eye, such as dust or soot, to particles that can only be seen with an electron microscope. Respirable PM of 10 microns in diameter or less is called PM_{10}. Fine particulate matter is a subgroup known as $PM_{2.5}$ and is defined as particles with a diameter of 2.5 microns or less.

PM can be emitted directly from primary sources or formed secondarily from reactions in the atmosphere. Primary sources include windblown dust, grinding operations, smokestacks, and fires. Secondary formation of PM occurs from reactions of gaseous precursors within the atmosphere, such as the formation of nitrates from NO_X emissions from combustion activities.

PM can accumulate in the respiratory system and aggravate health problems. These health effects include cardiovascular symptoms; cardiac arrhythmias; heart attacks; respiratory symptoms; asthma attacks; bronchitis; alterations in lung tissue, lung structure, and respiratory tract defense mechanisms; and premature death in people with heart or lung disease. Those at particular risk of increased health decline from exposure to PM include people with preexisting heart or lung disease, children, and seniors.

Lead

Lead is a metal that can be found naturally in the environment and also is released from metal production processes and manufactured products. In the past, motor vehicles were the major contributor of lead emissions to the air. However, because of increased regulations, air emissions of lead from vehicles have declined. The major sources of lead emissions to the air today are ore and metal processing and piston-engine aircraft operating on leaded aviation gasoline. Lead can accumulate in the bones and adversely affect the nervous system, kidney function, immune system, reproductive and developmental systems, and cardiovascular system. Lead exposure also affects the oxygen carrying capacity of the blood.

Toxic Air Contaminants and Potential Health Impacts

TACs are air pollutants that may lead to serious illness or increased mortality, even when present in relatively low concentrations. Hundreds of different types of TACs exist, with varying degrees of toxicity. Many TACs are confirmed or suspected carcinogens, or are known or suspected to cause birth defects or neurological damage. For some chemicals, such as carcinogens, no thresholds exist below which exposure can be considered risk-free. Examples of TAC sources used by cultivators licensed under the Proposed Program include CO_2, pesticides, fertilizers, soil amendments, and fossil fuel combustion sources.

Sources of TACs include stationary sources, areawide sources, and mobile sources. USEPA maintains a list of 187 TACs, also known as hazardous air pollutants or HAPs. These HAPs are included on CARBs list of TACs (CARB 2016c). According to the California Almanac of Emissions and Air Quality (CARB 2009), many researchers consider diesel PM to be a primary contributor to health risk from TACs because particles in the exhaust carry many harmful organic compounds and metals, rather than being a single substance, as are other TACs. Unlike many TACs, outdoor diesel PM is not monitored by CARB because no routine measurement method exists. However, using the CARB emission inventory's PM_{10} database, ambient PM_{10} monitoring data, and results from several studies, CARB has made preliminary estimates of diesel PM concentrations throughout the state (OEHHA 2001).

In addition to diesel PM, the TACs posing the greatest health risk in California, based primarily on ambient air quality monitoring data, are acetaldehyde, benzene, 1, 3-butadiene, carbon tetrachloride, hexavalent chromium, *para*-dichlorobenzene, formaldehyde, methylene chloride, and perchloroethylene (CARB 2009). In addition, pesticides are evaluated as potential TACs because of their potential health risks. A more detailed analysis of TACs and associated health risks, as they relate to cultivation operations under the Proposed Program, is presented in Section 4.7, *Hazards, Hazardous Materials, and Human Health*.

Sensitive Receptors

Sensitive receptors are those segments of the population most susceptible to the effects of poor air quality—children, the elderly, and individuals with preexisting serious health problems affected by air quality (e.g., asthma) (CARB 2005). Examples of locations that contain sensitive receptors are residences, schools and school yards, parks and playgrounds, daycare centers, nursing homes, and medical facilities. Residences include houses, apartments, and senior living complexes. Medical facilities can include hospitals, convalescent homes, and health clinics. Playgrounds include play areas associated with parks or community centers. Sensitive receptors located near licensed cultivation sites under the Proposed Program could include any of these groups depending on local land uses, zoning designations, and siting restrictions.

Existing Air Quality

Air quality impacts can occur over broad regions such as an air basin (e.g., California's San Joaquin Valley) or within local microclimates (e.g., the area surrounding a particular cultivation site). As noted above, Proposed Program cultivation activities could occur statewide. Therefore, this assessment discusses air quality on a regional, air basin level. Monitoring stations are located throughout the state and are used to determine the air quality of each region; monitoring data from 2013 through 2015 for 1-hour O_3, 8-hour O_3,

PM_{10}, and $PM_{2.5}$ for each of California's 15 air basins are provided in **Table 4.3-2** through **Table 4.3-5**, respectively.

Table 4.3-6 presents a summary of the CAAQS attainment status for all air basins in California (CARB 2016d). In addition, **Table 4.3-7** summarizes the NAAQS attainment status for all California air basins (USEPA 2016a). As previously mentioned, all air basins in California are either unclassified or in attainment for the NAAQS and CAAQS for CO, SO_2, and NO_2. Some air basins are classified as NAAs for the NAAQS and CAAQS for O_3, PM_{10}, and $PM_{2.5}$. In addition, a few air basins have been classified as NAAs for H_2S under the CAAQS. A portion of the South Coast Air Basin in Los Angeles County is designated as an NAA for the NAAQS for lead, while all other air basins are in attainment for the lead-related NAAQS and CAAQS. **Table 4.3-8** summarizes air basin CAAQS and NAAQS nonattainment status and approximate cannabis production by region.

Table 4.3-2. 1-Hour Ozone Air Monitoring Values for California Air Basins

Air Basin	# Exceedances (State)			Maximum (State), ppm		
	2013	2014	2015	2013	2014	2015
Great Basin Valleys	0	0	0	0.08	0.08	0.076
Lake County	0	0	1	0.067	0.074	0.107
Lake Tahoe	0	0	0	0.049	0.076	0.077
Mojave Desert	22	31	31	0.12	0.137	0.132
Mountain Counties	1	1	9	0.097	0.104	0.111
North Central Coast	1	0	0	0.096	0.083	0.079
North Coast	0	0	0	0.069	0.07	0.076
Northeast Plateau	0	0	0	0.077	0.082	0.076
Sacramento Valley	8	12	9	0.117	0.116	0.122
Salton Sea	20	14	6	0.113	0.108	0.106
San Diego	2	3	3	0.095	0.100	0.098
San Francisco Bay Area	3	3	7	0.096	0.097	0.106
San Joaquin Valley	41	48	47	0.123	0.128	0.135
South Central Coast	3	3	1	0.104	0.112	0.096
South Coast	70	74	71	0.151	0.141	0.144

Notes: " – " indicates that data were insufficient or unavailable. An exceedance value of zero indicates that no exceedances occurred. ppm = parts per million.

Table 4.3-3. 8-Hour Ozone Air Monitoring Values for California Air Basins

Air Basin	# Exceedances (National)			Maximum (National), ppm			# Exceedances (State)			Maximum (State), ppm		
	2013	2014	2015	2013	2014	2015	2013	2014	2015	2013	2014	2015
Great Basin Valleys	0	0	0	0.074	0.075	0.073	5	3	5	0.074	0.076	0.074
Lake County	0	0	0	0.064	0.068	0.063	0	0	0	0.064	0.068	0.064
Lake Tahoe	0	0	0	0.046	0.068	0.068	0	0	0	0.047	0.069	0.068
Mojave Desert	22	26	25	0.097	0.1	0.105	105	128	105	0.097	0.1	0.106
Mountain Counties	0	3	7	0.084	0.09	0.092	49	69	48	0.085	0.09	0.093
North Central Coast	0	0	0	0.074	0.075	0.068	5	4	0	0.074	0.076	0.068
North Coast	0	0	0	0.062	0.064	0.063	0	0	0	0.063	0.064	0.064
Northeast Plateau	0	0	0	0.071	0.065	0.066	1	0	0	0.071	0.066	0.067
Sacramento Valley	12	23	18	0.093	0.088	0.1	32	49	40	0.094	0.088	0.1
Salton Sea	15	12	5	0.104	0.093	0.092	89	71	58	0.104	0.094	0.093
San Diego	7	12	13	0.082	0.087	0.084	28	36	36	0.083	0.088	0.085
San Francisco Bay Area	3	5	7	0.079	0.08	0.084	3	10	12	0.08	0.081	0.085
San Joaquin Valley	89	86	82	0.106	0.104	0.11	112	128	99	0.106	0.105	0.11
South Central Coast	2	3	0	0.089	0.089	0.078	23	29	19	0.089	0.089	0.078
South Coast	88	92	81	0.122	0.11	0.127	119	129	115	0.123	0.111	0.128

Notes: " – " indicates that data were insufficient or unavailable. An exceedance value of zero indicates that no exceedances occurred. ppm = parts per million.

Table 4.3-4. PM_{10} Air Monitoring Values for California Air Basins

Air Basin	# Exceedances (National)			Maximum (National), µg/m³			# Exceedances (State)			Maximum (State), µg/m³		
	2013	2014	2015	2013	2014	2015	2013	2014	2015	2013	2014	2015
Great Basin Valleys	25.7	26.7	29.5	3,284	2,618	4,103	27.4	20.3	20.3	333	931	677
Lake County	-	-	-	-	-	-	0	0	6.1	31.3	35.2	61.1
Lake Tahoe	-	-	0	-	69.9	122.3	-	2	-	139.3	58.6	100.9
Mojave Desert	1.1	1	0	305.2	305.8	145.5	-	12.6	6.1	173.4	171	74.9
Mountain Counties	0	-	3	102.1	80	300.6	6.1	-	5	95.4	56.8	297.1
North Central Coast	0	0	0	98.4	99.2	72.6	-	-	-	-	-	-
North Coast	0	0	0	64.3	104.7	58.1	14.9	0	2	66.7	45.6	57.6
Northeast Plateau	0	0	0	54.6	90.6	65.5	-	-	6.1	50.4	82.9	59.6
Sacramento Valley	-	0	0	96.4	105.7	114.6	23.3	13.2	25.2	92.3	106.4	118
Salton Sea	6.1	-	-	359.3	471.8	381	145.8	183.7	128.2	385.7	477.6	382
San Diego	0	0	0	90	59	136	6	0	61	92	58	136
San Francisco Bay Area	0	0	0	55.8	57.8	58.8	15.2	3.1	3	58.1	61.3	58
San Joaquin Valley	3.8	8.4	0	224.2	430.1	143.3	122.3	138.8	121.4	183.6	419.5	140.3
South Central Coast	2.9	1.9	0	218.1	165.3	149.3	98.1	88.3	69.2	183.4	166.3	154
South Coast	2	1	6.6	286	157.2	188	90.2	128.5	123.8	199.2	131	180

Notes: " – " indicates that data were insufficient or unavailable. An exceedance value of zero indicates that no exceedances occurred. µg/m³ = micrograms per cubic meter.

Table 4.3-5. $PM_{2.5}$ Monitoring Values for California Air Basins

Air Basin	# Exceedances (National)			Maximum (National), µg/m³			# Exceedances (State)			Maximum (State), µg/m³		
	2013	2014	2015	2013	2014	2015	2013	2014	2015	2013	2014	2015
Great Basin Valleys	8.2	7	3.2	93.6	161	130.2	-	-	-	127.8	161	130.2
Lake County	0	0	6.1	19.6	17.1	57.7	-	-	-	19.6	17.1	57.7
Lake Tahoe	-	-	-	-	-	-	-	-	-	10.2	145.5	71.5
Mojave Desert	0	6.9	6.6	76.2	42	50.2	-	-	-	76.2	42	50.2
Mountain Counties	1.1	39.5	4	51.8	65.5	270.1	-	-	-	179.5	275.4	270.1
North Central Coast	0	0	1	54.8	49.6	43.2	-	-	-	54.8	49.6	43.2
North Coast	0	0	4.2	28.1	33	73.4	-	-	-	28.1	25.3	303.2
Northeast Plateau	12.3	-	-	43.5	71.9	51	-	-	-	43.5	71.9	51
Sacramento Valley	13	4	8.7	75.6	190.2	109.8	-	-	-	75.6	190.2	109.8
Salton Sea	3	9.9	3.5	36.3	51.7	87.1	-	-	-	70.8	58.9	102.7
San Diego	1.1	1	0	56.3	77.5	33.5	-	-	-	56.3	82.3	62.5
San Francisco Bay Area	6	2	3.3	57.7	60.4	49.4	-	-	-	57.7	60.4	49.4
San Joaquin Valley	50.4	40.4	38	167.3	107.2	107.8	-	-	-	167.3	107.2	111.9
South Central Coast	2.1	2	1	39.6	43	36	-	-	-	39.6	43	36
South Coast	9.2	-	17.6	60.3	73.6	70.3	-	-	-	170.8	74.7	86.5

Notes: " – " indicates that data were insufficient or available. An exceedance value of zero indicates that no exceedances occurred. µg/m³ = micrograms per cubic meter.

Table 4.3-6. California Ambient Air Quality Standards – Area Designations by Air Basin

Air Basin	O_3				PM_{10}			$PM_{2.5}$			CO			NO_2			SO_2			Lead			Sulfates			H_2S		
	N	NA-T	U	A	N	U	A	N	U	A	N	U	A	N	U	A	N	U	A	N	U	A	N	U	A	N	U	A
Great Basin Valleys	X[1]				X					X			X[1]			X			X			X			X			X[1]
Lake County				X			X			X			X			X			X			X			X			X
Lake Tahoe		X			X					X			X			X			X			X			X		
Mojave Desert	X				X			X[2]					X[2]			X			X			X			X[2]		
Mountain Counties	X[3]				X[3]			X[3]					X[3]			X			X			X			X[3]		
North Central Coast		X			X					X			X[4]			X			X			X			X		
North Coast				X	X[5]					X			X[5]			X			X			X			X			X[5]
Northeast Plateau				X	X[6]					X	X					X			X			X			X		
Sacramento Valley	X[7]				X			X[7]					X[7]			X			X			X			X		
Salton Sea	X				X			X[8]					X			X			X			X			X		
San Diego	X				X			X					X			X			X			X			X		
San Francisco Bay Area	X				X			X					X			X			X			X			X		
San Joaquin Valley	X				X			X					X[9]			X			X			X			X		
South Central Coast	X				X			X[10]					X			X			X			X			X[10]		
South Coast	X				X			X					X			X			X			X			X		

Notes:

N = Nonattainment; NA-T = Nonattainment-Transition; U = Unclassified; A = Attainment

[1] Great Basin Valleys Air Basin classifications: O_3 – N for Inyo and Mono Counties, U for Alpine County; CO and H_2S – A for Inyo and Mono Counties, U for Alpine County.

[2] Mojave Desert Air Basin classifications: $PM_{2.5}$ and H_2S – N for San Bernardino County, U for all other regions; CO – A for San Bernardino and Los Angeles Counties, U for all other regions.

[3] Mountain Counties Air Basin classifications: O_3 – N for all counties except Plumas and Sierra Counties, which are U; PM_{10} – N for all counties except Amador and Tuolumne Counties, which are U; $PM_{2.5}$ – U for all counties except Plumas County, which is N; CO – U for all counties except Plumas and Tuolumne Counties, which are A; H_2S – U for all counties except Amador County, which is N.

[4] North Central Coast Air Basin classifications: CO – A for Monterey County, U for San Benito and Santa Cruz Counties.

[5] North Coast Air Basin classifications: PM_{10}– A for Del Norte, Sonoma, and Trinity Counties, N for the remainder; CO – U for all counties except Humboldt and Mendocino Counties, which are A; H_2S – U for all counties except Humboldt and Sonoma Counties, which are A.

[6] Northeast Plateau Air Basin classifications: PM_{10} – A for Siskiyou County, N for the remainder.

[7] Sacramento Valley Air Basin classifications: O_3 – N for Butte, Placer, Sacramento, Shasta, Solano, Tehama, and Yolo Counties, A for Colusa and Glenn Counties, and NA-T for the remainder; $PM_{2.5}$ – N for Butte County, A for Colusa, Glenn, Placer, Sacramento, Shasta, Sutter, and Yuba Counties, and U for the remainder; CO – A for Butte, Placer, Sacramento, Solano, Sutter, and Yolo Counties, U for the remainder.

[8] Salton Sea Air Basin classifications: $PM_{2.5}$ – N for Imperial County, A for the remainder.

[9] San Joaquin Valley Air Basin classifications: CO – A for Fresno, Kern, San Joaquin, Stanislaus, and Tulare Counties, U for the remainder.

[10] South Central Air Basin classifications: $PM_{2.5}$ – A for San Luis Obispo and Ventura Counties, U for Santa Barbara County; H_2S - A for San Luis Obispo and Santa Barbara Counties, U for Ventura County.

Source: CARB 2016d

Table 4.3-7. NAAQS Attainment Status by Air Basin

Air Basin	O_3		PM_{10}			$PM_{2.5}$		CO		NO_2		SO_2		Lead	
	N	U/A	N	U	A	N	U/A	N	U/A	N	U/A	N	U/A	N	U/A
Great Basin Valleys		X	X[1]				X		X		X		X		X
Lake County		X		X			X		X		X		X		X
Lake Tahoe		X		X			X		X		X		X		X
Mojave Desert	X[1]		X[2]				X		X		X		X		X
Mountain Counties	X[3]			X		X[3]			X		X		X		X
North Central Coast		X		X			X		X		X		X		X
North Coast		X		X			X		X		X		X		X
Northeast Plateau		X		X			X		X		X		X		X
Sacramento Valley	X[4]		X[4]				X		X		X		X		X
Salton Sea	X		X			X[5]			X		X		X		X
San Diego	X			X			X		X		X		X		X
San Francisco Bay Area	X			X			X		X		X		X		X
San Joaquin Valley	X				X	X			X		X		X		X
South Central Coast	X[6]			X			X		X		X		X		X
South Coast	X				X	X			X		X		X	X[7]	

Notes:

A = Attainment; N = Nonattainment; NA-T = Nonattainment-Transition; U = Unclassified; U/A = Unclassified/Attainment

All $PM_{2.5}$ attainment status designations were based on the annual standard.

[1] Great Basin Valleys Air Basin classifications: PM_{10} – N for portions of Mono and Inyo Counties, U/A for all other areas.

[2] Mojave Desert Air Basin classifications: O_3 – N for all but eastern portions of San Bernardino and Riverside Counties, which are A; PM_{10} – N for San Bernardino, Riverside, and portions of Kern Counties, U/A for all other areas.

[3] Mountain Counties Air Basin classifications: O_3 – N for Nevada, Placer, El Dorado, Calaveras, and Mariposa Counties; U/A for Plumas, Sierra, Amador, and Tuolumne Counties; $PM_{2.5}$ – N for part of Plumas County, U/A for all other areas.

[4] Sacramento Valley Air Basin classifications: O_3 – N for Butte, Sutter, Placer, Sacramento, Yolo, and Solano Counties, U/A for all other areas; PM_{10} – N for Sacramento County, U for all other counties.

[5] Salton Sea Air Basin classifications: $PM_{2.5}$ – N for a portion of Imperial County, U for all other areas.

[6] South Central Coast Air Basin classifications: O_3 = N for Ventura County and the eastern portion of San Luis Obispo County, U/A for all other areas.

[7] South Coast Air Basin classifications: lead – N for a portion of Los Angeles County, U/A for all other areas.

Sources: USEPA 2016b, 2016c

Table 4.3-8. Air Basin CAAQS and NAAQS Nonattainment Status and Approximate Cannabis Production by Region

Air Basin (Counties)	O_3		PM_{10}*		$PM_{2.5}$		Cannabis Production Region**	Estimated 2016 Cannabis Production (lbs) by Region**
	NAAQS	CAAQS	NAAQS	CAAQS	NAAQS	CAAQS		
Great Basin Valleys (Alpine, Inyo, Mono)		X[5]	X[5]	X			Southeast Interior (portion), Intermountain (portion)	300,000 + 3,875,000
Lake County (Lake)							North Coast (portion)	4,150,000
Lake Tahoe (El Dorado, Placer)		X (NA-T)		X			Intermountain (portion)	3,875,000
Mojave Desert (Kern, Los Angeles, San Bernardino, Riverside)	X[1]	X	X[1]	X		X[1]	Southeast Interior (portion), South San Joaquin Valley (portion), South Coast (portion)	300,000 + 1,750,000 + 625,000
Mountain Counties (Amador, Calaveras, El Dorado, Mariposa, Nevada, Placer, Plumas, Sierra, Tuolumne)	X[2]	X[2]		X[2]	X[2]	X[2]	Intermountain (portion), Southeast Interior (portion)	3,875,000
North Central Coast (Monterey, San Benito, Santa Cruz)		X (NA-T)		X			Central Coast (portion)	1,350,000
North Coast (Del Norte, Humboldt, Mendocino, Sonoma, Trinity)				X[6]			North Coast (portion), Intermountain (portion)	4,150,000 + 3,875,000
Northeast Plateau (Lassen, Modoc, Siskiyou)				X[7]			Intermountain (portion)	3,875,000
Sacramento Valley (Butte, Colusa, Glenn, Placer, Sacramento, Shasta, Solano, Sutter, Tehama, Yolo, Yuba)	X[3]	X[3]	X[3]	X		X[3]	Intermountain (portion), Sacramento Valley	3,875,000 + 1,000,000
Salton Sea (Imperial, Riverside)	X	X	X	X	X[8]	X[8]	Southeast Interior (portion)	300,000
San Diego (San Diego)	X	X		X		X	South Coast (portion)	625,000

Air Basin (Counties)	O_3		PM_{10}*		$PM_{2.5}$		Cannabis Production Region**	Estimated 2016 Cannabis Production (lbs) by Region**
	NAAQS	CAAQS	NAAQS	CAAQS	NAAQS	CAAQS		
San Francisco Bay Area (Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma)	X	X		X		X	Bay Area, Central Coast (portion), North Coast (portion), Sacramento Valley (portion)	175,000 + 1,350,000 + 4,150,000 + 1,000,000
San Joaquin Valley (Fresno, Kern, Kings, Madera, Merced, San Joaquin, Stanislaus, Tulare)	X	X		X	X	X	North San Joaquin Valley, South San Joaquin Valley (portion)	275,000 + 1,750,000
South Central Coast (San Luis Obispo, Santa Barbara, Ventura)	X[4]	X		X		X[4]	Central Coast (portion), South Coast (portion)	1,350,000 + 625,000
South Coast (Los Angeles, Orange, Riverside, San Bernardino)	X	X		X	X	X	South Coast (portion), Southeast Interior (portion)	625,000 + 300,000

Notes: NAAQS = National Ambient Air Quality Standards; NA-T = Nonattainment-Transition; CAAQS = California Ambient Air Quality Standard; X = nonattainment of that ambient air quality standard

*All $PM_{2.5}$ attainment status designations were based on the annual standard.

**Cannabis production by region includes an entire economic region, which may overlap with multiple air basins, and therefore is not the individual amount assigned to a particular air basin. The statewide total of 2016 cannabis production is $13,500,000. Cannabis production regions consist of the following counties:

Bay Area production region includes Alameda, Contra Costa, San Francisco, and San Mateo Counties.

Central Coast production region includes Monterey, San Benito, San Luis Obispo, Santa Clara, and Santa Cruz Counties.

Intermountain production region includes Amador, Alpine, Calaveras, El Dorado, Lassen, Placer, Plumas, Modoc, Nevada, Shasta, Sierra, Siskiyou, and Trinity Counties.

North Coast production region includes Del Norte, Humboldt, Lake, Marin, Mendocino, Napa, and Sonoma Counties.

North San Joaquin Valley production region includes Madera, Merced, San Joaquin, and Stanislaus Counties.

Sacramento Valley production region includes Butte, Colusa, Glenn, Sacramento, Solano, Sutter, Tehama, Yolo, and Yuba Counties.

South Coast production region includes Los Angeles, Orange, San Diego, Santa Barbara, and Ventura Counties.

South San Joaquin Valley production region includes Fresno, Kern, Kings, and Tulare Counties.

Southeast Interior production region includes Imperial, Inyo, Mariposa, Mono, Riverside, San Bernardino, and Tuolumne Counties.

Notes on Attainment Status:

A = attainment; N = nonattainment; U = unclassified; U/A = unclassified/attainment.

[1] Mojave Desert Air Basin classifications: O_3 – N for all but eastern portions of San Bernardino and Riverside Counties; PM_{10} – N for San Bernardino, Riverside, and portions of Kern Counties, U/A for all other areas; $PM_{2.5}$ and H_2S – N for San Bernardino County, U for all other areas.

[2] Mountain Counties Air Basin classifications: CAAQS O_3 – N for Nevada, Placer, El Dorado, Calaveras, and Mariposa Counties, U/A for Plumas, Sierra, Amador, and Tuolumne Counties; CAAQS $PM_{2.5}$ – N for part of Plumas County, U/A for all other areas; NAAQS O_3, this air basin is classified as N for all counties within the air basin except Plumas and Sierra Counties, which are classified as U; PM_{10} – N for all counties except Amador and Tuolumne Counties, which are U; NAAQS $PM_{2.5}$ – U for all counties except Plumas County, which is N.

[3] Sacramento Valley Air Basin classifications: CAAQS O_3 – N for Butte, Sutter, Placer, Sacramento, Yolo, and Solano Counties, U/A for all other areas; PM_{10} – N for Sacramento County, U for all other counties; NAAQS O_3, the Sacramento Valley Air Basin is classified as N for Butte, Placer, Sacramento, Shasta, Solano, Tehama, and Yolo Counties; Colusa and Glenn Counties are classified as A; and the remainder of the air basin is classified as NA-T; $PM_{2.5}$ – N for Butte County, A for Colusa, Glenn, Placer, Sacramento, Shasta, Sutter, and Yuba Counties, U for the remainder of the air basin.

[4] South Central Coast Air Basin classifications: O_3 – N for Ventura County and the eastern portion of San Luis Obispo County, U/A for all other areas; $PM_{2.5}$ – A for San Luis Obispo and Ventura Counties, U for Santa Barbara County.

[5] Great Basin Valleys Air Basin classifications: O_3 – N for Inyo and Mono Counties, U for Alpine County; PM_{10} – N for portions of Mono and Inyo Counties, U/A for all other areas.

[6] North Coast Air Basin classifications: PM_{10} – A for Del Norte, Sonoma, and Trinity Counties, N for the remainder of the air basin.

[7] Northeast Plateau Air Basin classifications: PM_{10} – A for Siskiyou County, N for the remainder of the air basin.

[8] Salton Sea Air Basin classifications: CAAQS $PM_{2.5}$ – N for a portion of Imperial County, U for all other areas; NAAQS $PM_{2.5}$ – N for Imperial County, A for the remainder of the air basin.

Sources: USEPA 2016b, 2016c; ERA Economics 2017

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Nuisance Odors

Cannabis plants, primarily when they are in the flowering stage, are known to emit a distinctive odor that may be detectable beyond cultivation site property boundaries whether they are grown indoors or outdoors (Mendocino County 2016). In addition to the odors emitted by the plants, the products of cultivation (such as the harvested cannabis flowers) also emit odors. Specifically, one study found that cannabis products emit as many as 233 volatile compounds and that odors vary between freshly packaged cannabis and older cannabis products (Rice and Koziel 2015).

The determination of odors as offensive or a "nuisance," particularly cannabis, is quite often subjective and based on a number of factors. For example, the Oregon judicial system found that cannabis odors can be offensive to some people and enjoyable to others (Los Angeles Times 2015). The Oregon judicial system also found that the perception of whether a cannabis odor was offensive was linked to the intensity, duration, and frequency of the odor and the location at which the odor occurred (i.e., outdoors versus at a residence) (Los Angeles Times 2015). Impacts from cannabis odors identified by Denver Environmental Health in Denver, Colorado, have been reported to include headaches, eye and throat irritation, nausea, discomfort being outside (e.g., exercising, gardening, socializing), mental stress, and lack of desire to entertain due to strong odors (Denver Environmental Health 2016).

Complaints to local agencies regarding odors from cannabis cultivation sites have led to agencies requiring buffers between sensitive receptors and cultivation sites, requiring implementation of odor control technologies and odor control plans, establishing qualitative or quantitative odor limits, and restricting cultivation site locations or authorization for new growers (Yakima Herald 2016). Although these techniques are helpful in reducing nuisance odors, defining a "nuisance odor," particularly with regard to cannabis, is not well documented. For example, a Colorado odor advisory group made up of agency, consultant, and public representatives found that the "technical research and literature is limited regarding cannabis-generated odors, the chemical compounds making up these odors, and the levels at which these chemicals would need to be controlled in order to prevent these odors" (City of Denver 2016a). Regardless, the City of Denver, Colorado, has established a nuisance odor detection threshold, which is the detection of odorous contaminants when one volume of the odorous air has been diluted with seven or more volumes of odor-free air as measured by any instrument, device, or method designated by the state air pollution control division (City of Denver 2016b). One tool used by Denver enforcement officers is an odor detection device ("Nasal Ranger") that combines specially filtered air with outside air in measured increments (USA TODAY 2014).

4.3.4 Impact Analysis

Methodology

Conflict with Air Quality Plans and Violate Air Quality Standards

For this PEIR, quantification of baseline criteria pollutant emissions, and the change from baseline, was not feasible due to a lack of sufficient information about existing and future cultivation operations within individual air basins to support such an analysis. For example, while the SRIA (ERA Economics 2017) has estimated cannabis production by region of the

state, as well as the type of production (outdoor, indoor, mixed-light), the regions used overlap multiple air basins, and cannabis cultivation would not be expected to be uniform across an entire region. In addition, a wide range of variation exists in cultivation techniques for each type of cultivation approach (outdoor, indoor, mixed light), including extent and intensity of use of emissions-generating vehicles and equipment—from generators to HVAC systems. In short, developing assumptions regarding "typical" scenarios for cultivation would necessitate speculation, and even if such scenarios were developed, the information collected and generated for CDFA's regulation development process does not support quantification of where and how such scenarios could change across the state's air basins.

For this reason, the change from baseline related to criteria air pollutant emissions under the Proposed Program, and the potential for those emissions to contribute to existing air quality impairments, thereby conflicting with air quality plans or to violate air quality standards, were qualitatively evaluated. The qualitative analysis considered the typical criteria air pollutant emission sources associated with cannabis cultivation, the existing air quality conditions throughout the state, and the Proposed Program's potential to alter cultivation operations (both permitted and unpermitted) in method or magnitude from existing cannabis cultivation operations.

Exposure of Sensitive Receptors to Substantial Pollutant Concentrations

The Proposed Program's potential to emit substantial pollutant concentrations of TACs and thereby expose sensitive receptors was qualitatively evaluated by considering the equipment, vehicle and chemical usage for cannabis cultivation operations, and the potential proximity of these operations to sensitive receptors, considering baseline TAC emissions associated with cannabis cultivation.

Odors

Odors were evaluated on a qualitative basis by considering potential odor-generating sources under the Proposed Program and the proximity of cultivation operations to sensitive receptors. While baseline conditions may be relevant to the extent that receptors may be habituated to the odors, the analysis considered the potential for all future odors to be substantially adverse, regardless of the baseline level of odor emissions.

Significance Criteria

For the purposes of this analysis, based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines, the Proposed Program would result in a significant impact related to air quality if it would:

A. Conflict with or obstruct implementation of an applicable air quality plan;

B. Violate any air quality standard or contribute substantially to an existing or projected air quality violation;

C. Expose sensitive receptors to substantial pollutant concentrations; or

D. Create objectionable odors affecting a substantial number of people.

Many individual air districts establish mass emission thresholds based on detailed, basin-specific analyses to determine the level at which an increase in emissions from baseline, when dispersed in the atmosphere, would be likely to cause an increase in concentrations above the applicable ambient air quality standard or exacerbate an existing exceedance if the threshold is exceeded. If the incremental increase in emissions for a project compared to the baseline is below these annual thresholds, the project's impacts would be less than significant. These air districts have determined that projects below the mass emission significance threshold would also not be cumulatively considerable. While these thresholds would be useful for a project-level analysis, they do not assist in the qualitative approach used in this PEIR, and so have not been used as the basis for determining the significance of criteria pollutant emissions under the Proposed Program.

Some air districts have established quantitative thresholds for acute, chronic non-cancer and cancer exposure to TACs. Because Proposed Program activities would occur at different locations and with different intensities, such an analysis would not be applicable.

Environmental Impacts of the Proposed Program

General Cultivation Impacts

Impact AQ-1: Conflict with or obstruct implementation of an applicable air quality plan, and/or violate any air quality standard or contribute substantially to an existing or projected air quality violation. (Less than Significant)

General cultivation impacts include impacts of any type of cultivation activity: outdoor, mixed-light, indoor, nursery, and processing.

Under both baseline conditions and the Proposed Program, cannabis cultivation may include the operation of gasoline- or diesel-fueled equipment (e.g., generators, irrigation pumps, loaders, ventilation fans, and potentially gasoline-fueled landscaping equipment) and truck or vehicle trips to and/or from the site by vendors and workers, which would result in direct criteria air pollutant emissions from fuel combustion. Combustion of fossil fuels from diesel- or gasoline-fueled equipment or vehicles used for cannabis cultivation activities would generate ozone precursors (NO_X, ROG), CO, and particulate matter (PM_{10} and $PM_{2.5}$). In addition, cultivation operations—primarily outdoor cultivation—may generate fugitive dust emissions through ground-disturbing activities such as ground tilling, uncovered soil or compost piles, and vehicle or truck trips on unpaved roads. These activities would potentially contribute fugitive dust emissions (PM_{10} and $PM_{2.5}$). Cannabis cultivation equipment operated by electricity would not contribute directly to criteria air pollutant emissions at or immediately adjacent to the cannabis cultivation site, but would contribute indirectly to criteria air pollutant emissions if the electricity consumed was generated by the combustion of fossil fuels.

California's air basins are in varying levels of attainment for NAAQS and CAAQS for criteria air pollutants (**Table 4.3-6** and **Table 4.3-7**). Cannabis cultivation operations under both baseline conditions and the Proposed Program would emit criteria air pollutants and potentially contribute to these eXisting air quality impairments or violate applicable air quality standards. Elevated local concentrations of some criteria air pollutants can also cause local exceedances of air quality standards. CO, PM_{10}, and $PM_{2.5}$ are the criteria air pollutants of concern for local hot-spot analyses. NO_X and ROG emissions typically are a

concern only on a regional scale because they take time to react and disperse in the environment to create O_3.

The likelihood that cannabis cultivation–related criteria pollutant emissions comply with air quality plans and not conflict with the air quality standard attainment goals, or contribute to air quality impairments or violation of standards, is dependent on multiple factors, including, but not limited to, the following:

- the extent of cannabis cultivation activities within a particular air basin;
- the type and quantity of use, on a daily and annual basis, of pollutant-emitting equipment or vehicles;
- the quantity and extent of cannabis cultivation practices, such as ground disturbance or use of unpaved or gravel roads;
- the extent of unlicensed/unpermitted cannabis cultivation activities within a particular air basin;
- the existing air quality attainment status of the local air basin and the corresponding need for air quality plans; and
- the specific goals, policies, and/or measures identified in air quality plans and their applicability to cannabis cultivation–related activities.

To the extent that cannabis cultivation-related emissions would increase in a particular air basin under the Proposed Program compared to the baseline, cultivation operations under the Proposed Program may contribute to nonattainment conditions in local air basins or violations of the applicable air quality plans, their corresponding policies, and emissions standards. To the extent that emissions would decrease as a result of the Proposed Program, and/or the extent that currently unpermitted and unregulated cultivation sites become a part of the Proposed Program and become part of air district planning processes, the Proposed Program would be anticipated to make beneficial contributions to nonattainment conditions or violations of plans, policies and standards.

Despite the potential air quality emission-generating sources described above that are associated with cannabis cultivation activities, it is not anticipated that the Proposed Program would conflict with or obstruct implementation of air quality plans for the numerous reasons outlined below. First, the cannabis cultivation activities under the Proposed Program would not be anticipated to generate a substantial number of vehicle trips (see Section 4.12, *Transportation and Traffic*) that would affect air quality. In addition, outdoor and mixed-light cultivation activities would generally occur on such small acreages that these activities would often not require intensive use of heavy equipment.

According to the SRIA (ERA Economics 2017), the total cannabis production in the state (both Prop-215 compliant and illegal—approximately 13.5 million pounds in 2016) would remain essentially unchanged (decrease of approximately 6.8 percent) with implementation of the Proposed Program. While the SRIA estimates shifts in cannabis cultivation types (indoor, outdoor, mixed-light) that would result from implementation of the Proposed Program, sufficient information is not available to determine in which air basins these shifts may occur, or the specifics of how such cultivation activities would be conducted, to allow a determination of how emissions may change in each air basin. That said, on a statewide

basis, the potential criteria pollutant emissions from licensed cannabis cultivation and the potential to conflict with air quality plans would not change substantially from existing conditions.

In addition, the SRIA (ERA Economics 2017) predicts that under the Proposed Program, the quantity of cannabis produced by unlicensed cultivators would decrease from 1.85 million pounds to approximately 1.25 million pounds, or a decrease of roughly 600,000 pounds or 4.5% of total production, with a corresponding increase in licensed production. Compared to unlicensed cultivators, licensed cultivators would be more likely to comply with all applicable federal, state, and local regulations, and would be subject to monitoring and enforcement provisions. As a result, the shift towards licensure would be expected to increase compliance with requirements for equipment and mobile sources targeted at reducing emissions, compared with unlicensed operations. This includes ATCM regulations that reduce the emissions of specific types of equipment. Pesticide use would also be expected to increasingly comply with applicable regulations, including regulations related to controlling the VOC emissions from pesticides in nonattainment areas. In addition, licensees under the Proposed Program would be required to comply with local regulations and ordinances, including those focused on cannabis cultivation, many of which mandate qualitative restrictions on the emission of nuisance dust or smoke. Burning of cannabis waste would not be allowed under the CalCannabis Cultivation Licensing program and, thus, would not contribute to criteria air pollutant emissions.

Licensees under the Proposed Program would also be required to comply with environmental protection measures established in Section 8313 and Section 8315 of the proposed regulations. These measures would potentially reduce criteria air pollutant emissions associated with cannabis cultivation compared to the baseline by prohibiting the use of diesel generators other than for backup power, and by requiring that indoor cultivators achieve the state's greenhouse gas emissions reduction targets by utilizing renewable sources for their electrical power needs, purchasing carbon offsets, and/or use efficient equipment.

For these reasons, licensed cannabis cultivation under the Proposed Program is generally not anticipated to conflict with or obstruct implementation of an applicable air quality plan, and/or violate any air quality standard or contribute substantially to an existing or projected air quality violation. As part of the application process, this conclusion would be reviewed, based on a site-specific evaluation, to evaluate whether significant impacts could occur at a particular location. To the extent that significant impacts are possible that have not been considered in this PEIR, a site-specific CEQA document would be required, for instance as part of the approval process undertaken by the local agency and/or other responsible agencies (including, potentially, CDFA). For ongoing operations, the various requirements outlined in the previous paragraphs would generally be expected to reduce criteria pollutant emissions and have a beneficial impact. For new operations, criteria air pollutant emission sources would need to be evaluated as to the extent to which they may conflict with air quality plans or exceed individual air basin significance thresholds, and as appropriate, develop mitigation measures to comply with the local Air District's plans, thresholds, and/or other applicable policies.

Therefore, issues regarding impacts on air quality plans and impairments would be either beneficial, or would generally be addressed/resolved on a site-specific level, in many cases

well before the time the applicant applies for a license from CDFA under the Proposed Program. Therefore, this impact would be **less than significant**.

Impact AQ-2: Expose sensitive receptors to substantial pollutant concentrations as a result of cannabis cultivation. (Less than Significant)

As described in Impact AQ-1, equipment used for cannabis cultivation activities under both the baseline and the Proposed Program may emit criteria pollutants or noxious gases, and thereby potentially expose nearby sensitive receptors or cannabis workers to these pollutants. Potential pollutants of concern (TACs) include PM and dust, pesticides, asbestos, CO_2, and mold. PM or fugitive dust may be emitted from fossil fuel combustion by portable diesel- and gasoline-powered generators (which may be used on a stationary basis that would be operating for extended periods under baseline conditions, but which would only be used periodically for backup power under the Proposed Program), or as wind-transported particles from unpaved and disturbed access roads associated with cultivation activities. Because of the relatively short duration for operating diesel- and gasoline-powered off-road equipment when conducting a specific cultivation activity, TAC emissions would not be likely to contribute to substantial exposure of a sensitive receptor to TACs; rather, the exposure generally would be indistinguishable from that generated by other equipment typically operating in locations where the activities would occur. Pesticides applied via sprayers could potentially affect workers or adjacent sensitive receptors if not properly applied. Cultivation workers may be exposed to naturally occurring asbestos (NOA) if cultivation operations disturb soils within areas that contain NOA.

In indoor cultivation areas, workers could be exposed to hazards associated with oxygen-deficient air or mold spores. Improper operation of CO_2 generators could potentially result in oxygen-deficient air (Gustin 2010). Mold spores have been found in indoor cultivation areas at levels that greatly exceed outdoor levels (by more than 10 times) and pose a risk of causing multiple health problems (e.g., difficulty breathing, chest tightness, and headache) for persons exposed to the mold without proper respiratory protection equipment (Martyny et al. 2010).

The potential effects of cannabis cultivation–related pollutants on sensitive receptors would vary based on the proximity of sensitive receptors to the cultivation sites, the type of cultivation equipment and frequency and duration of equipment use.

Licensed cultivators would be required to implement a number of requirements which would reduce impacts at the cultivation site, compared to baseline conditions where many cultivators are not implementing these requirements (NCRWQB 2013, CVRWQB 2014, Gabriel et al. 2013). Specifically, under the Proposed Program, licensed cultivators would be required to implement the environmental protection measures in the proposed regulations described above in Impact AQ-1, as well as other regulatory requirements such as BMPs for erosion control in unpaved areas. For cultivation workers, the potential effects of exposure to TACs from cannabis cultivation operations would be reduced by the proper use and maintenance of equipment, implementation of safety requirements, the quality and cleanliness of work areas, and, if necessary, the use of personal protective equipment. Use of the potential pesticides analyzed in Appendix F, *Human Health and Ecological Screening Risk Evaluation,* were determined to not pose a health risk to cultivation workers if typical standards from the production agriculture industry are followed that include, but are not limited to, reading and following pesticide label directions. In addition, the Proposed

Program's environmental protection measures related to TACs, specifically the pesticide use and storage requirements, and other pesticide laws and regulations enforced by CDPR (Section 8313), would require cultivators to implement appropriate BMPs associated with pesticide use, storage, and disposal. Additionally, the requirement that licensees operate in compliance with all applicable state law and local ordinances, would include regulations related to fugitive dust.

For ongoing cultivation operations obtaining licenses under the Proposed Program, compliance with these requirements would generally be anticipated to have a beneficial impact. For new operations, it would be anticipated to reduce the potential for impacts compared to the existing, less regulated, condition.

Typically, local agencies are responsible for ensuring that no substantial impacts would occur on sensitive receptors related to pollutants that could occur at higher concentrations locally (such as CO or diesel particulate matter [DPM]), and the federal and state Occupational Safety and Health Administrations (OSHAs) are responsible for regulating and enforcing worker safety measures. As described in Impact AQ-1, for individual licenses, a site-specific evaluation would be necessary to evaluate whether significant impacts could occur at a particular location. Implementation of a site-specific evaluation and CEQA document, and of appropriate mitigation measures to comply with the applicable policies from local agencies or the federal and state OSHAs would be expected to address/resolve any impacts related to exposing sensitive receptors to substantial pollutant concentrations as a result of cannabis cultivation, often well before the time the applicant applies for a license from CDFA under the Proposed Program.

For these reasons, implementation of the Proposed Program would not expose sensitive receptors or cultivation workers to substantial quantities of TACs or other pollutants. Therefore, this impact would be **less than significant**.

Impact AQ-3: Create objectionable odors affecting a substantial number of people as a result of cannabis cultivation. (Less than Significant)

During the cultivation of cannabis, odors would be emitted from the plants, particularly mature (i.e., flowering) plants. Other odor sources would include the use or storage of fertilizers; soil storage or composting areas; or the use of diesel-powered equipment, which emit DPM. These odors could potentially affect nearby sensitive receptors. Odors from cultivation operations may be contained to some degree if grown within a structure (e.g., greenhouse or building); however, odors from these areas may still be emitted through ventilation systems from greenhouses or other enclosed cultivation areas, and may potentially be concentrated in that process.

Fertilizers and soil or compost piles may contain decaying organic material that may create an objectionable odor. The intensity of the odor perceived by a receptor would depend on the distance of the receptor from the soil or compost stockpiling area and the amount and quality of the exposed material. The preparation and application of pesticides may emit objectionable odors associated with the pesticide ingredients; however, these emissions would be temporary in any specific location and are generally expected to dissipate shortly after application. Most diesel-powered equipment or vehicles would be operating for a limited amount of time in any given location and would not act as a substantial odor source.

Of the various odor sources described above, the primary odor of concern to many sensitive receptors is that emitted from the cannabis itself, and other odors would not be anticipated to generally be perceived as substantially adverse, especially in comparison to the odor of cannabis. As described in the environmental setting, the degree to which an individual or community finds the odor of cannabis plants objectionable is highly variable. In cases where the perception of the odor as objectionable is widespread in a community, CDFA anticipates that the community has developed or will develop odor control requirements which match their local community expectations and standards, including and up to banning cultivation altogether. Cultivators in these locations would be required to comply with applicable local cannabis cultivation-, nuisance- or odor-related policies and regulations. For these reasons, cultivation under the Proposed Program would not be anticipated to emit odors that would be considered objectionable by a substantial number of people, especially when considered on a statewide basis. This impact would therefore be **less than significant**.

4.4 Biological Resources

4.4.1 Introduction

This section of the Program Environmental Impact Report (PEIR) presents the environmental setting and potential impacts of the California Department of Food and Agriculture's (CDFA's) CalCannabis Cultivation Licensing program (Proposed Program) related to biological resources. The biological resources include special-status plant and wildlife species; sensitive natural communities, including jurisdictional wetlands and other waters; and wildlife movement corridors.

4.4.2 Regulatory Setting

Some of the regulatory setting relevant to biological resources is described in Section 4.8, *Hydrology and Water Quality*. Refer to that section for descriptions of the following laws, regulations, and policies:

- California Porter–Cologne Water Quality Control Act of 2006, Section 401;
- Clean Water Act of 1972, Section 404; and
- Cannabis-specific water quality regulations established by the State Water Resources Control Board (SWRCB) and the regional water quality control boards (RWQCBs).

Federal Laws, Regulations, and Standards

Endangered Species Act of 1973

The Endangered Species Act (ESA) (16 U.S. Code [USC] Section 1531 et seq.; 50 Code of Federal Regulations [CFR] Parts 17 and 222) provides for conservation of species that are endangered or threatened throughout all or a significant portion of their range, as well as the protection of habitats on which they depend. The U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) share responsibility for implementing the ESA. In general, USFWS manages land and freshwater species, whereas NMFS manages marine and anadromous species. The ESA and subsequent amendments provide guidance for projects that may affect the continued existence of federally listed species or adversely affect their designated critical habitat.

Section 9 (Prohibited Acts)

Section 9 of the ESA and its implementing regulations prohibit the take of any fish or wildlife species listed under the ESA as endangered or threatened, unless otherwise authorized by federal regulations. The term "take" means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." USFWS has interpreted the definition of harm to include habitat modification. Section 9 prohibits a number of specified activities with respect to endangered and threatened plants as well as adverse modifications to critical habitat.

Section 7 (Interagency Consultation and Biological Assessments)

Section 7 of the ESA (16 USC Section 1531 et seq.) outlines the procedures for federal interagency cooperation to conserve federally listed species and designated critical habitats. Section 7(a)(1) directs the Secretary of the Interior (for species managed by USFWS) or the Secretary of Commerce (for species managed by NMFS) to review other programs administered by those departments and use such programs to further the purposes of the ESA. It also directs all other federal agencies to use their authorities in furtherance of the purposes of the ESA by carrying out programs for the conservation of species listed pursuant to the ESA. Section 7(a)(2) states that each federal agency shall, in consultation with the Secretary, ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. In fulfilling these requirements, each agency must use the best scientific and commercial data available. This section of the ESA defines the consultation process, which is further developed in regulations promulgated by 50 CFR Section 402.

Section 10 (Habitat Conservation Plans)

Section 10(a)(1)(B) of the ESA provides a process by which nonfederal entities may obtain an incidental take permit from the USFWS or NMFS for otherwise lawful activities that incidentally may result in take of endangered or threatened species, subject to specific conditions. A habitat conservation plan (HCP) must accompany an application for an incidental take permit. The HCP associated with the permit ensures that the effects of the authorized incidental take are adequately minimized and mitigated.

Magnuson-Stevens Fishery Conservation and Management Act (Sustainable Fisheries Act)

The amended Magnuson-Stevens Fishery Conservation and Management Act of 1996, also known as the Sustainable Fisheries Act, provides for the conservation and management of all fish resources within the exclusive economic zone of the United States. It requires that all federal agencies consult with NMFS on activities or proposed activities authorized, funded, or undertaken by that agency that may adversely affect Essential Fish Habitat of commercially managed marine and anadromous fish species.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (16 USC Sections 703–712; 50 CFR Subchapter B) makes it unlawful to pursue, hunt, take, capture, kill, or possess any migratory birds, or part, nests, or eggs of such migratory birds, that are listed in wildlife protection treaties between the United States and Canada, Mexico, Japan, and Russia. The MBTA applies to almost all avian species that are native to California. The MBTA prohibits the take of such species, including the removal of nests, eggs, and feathers. It requires that all federal agencies consult with USFWS on activities or proposed activities authorized, funded, or undertaken by that agency that may adversely affect migratory birds.

The Migratory Bird Treaty Reform Act amends the MBTA so that nonnative birds or birds that have been introduced by humans to the United States or its territories are excluded from protection under the MBTA.

Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, directs each federal agency taking actions that have or may have adverse impacts on migratory bird populations to work with USFWS to develop a memorandum of understanding to promote the conservation of migratory bird populations.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act prohibits the taking or possession of and commerce in bald and golden eagles, with limited exceptions (16 USC. Section 668). Under the Bald and Golden Eagle Protection Act, it is a violation to "take, possess, sell, purchase, barter, offer to sell, transport, export or import, at any time or in any manner, any bald eagle commonly known as the American eagle, or golden eagle, alive or dead, or any part, nest or egg, thereof…". *Take* is defined to include pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest, and disturb. *Disturb* is further defined in 50 CFR Part 22.3 as "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

State Agencies, Laws, and Programs

California Fish and Game Code

Sections 2050-2098 (California Endangered Species Act)

The California Endangered Species Act (CESA) (California Fish and Game Code Sections 2050–2098) declares that it is the policy of the State that State agencies should not approve projects that would jeopardize the continued existence of a species listed under CESA as endangered or threatened or result in the destruction or adverse modification of habitat essential to the continued existence of those species, if reasonable and prudent alternatives are available consistent with conserving the species or its habitat that would prevent jeopardy (California Fish and Game Code Section 2053).

Section 2080 of the Fish and Game Code prohibits the take of any species that is state-listed as endangered or threatened, or designated as a candidate for such listing. "Take" is defined by Section 86 of the Fish and Game Code as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill" an individual of a listed species. Under the CESA, the California Department of Fish and Wildlife (CDFW) may issue an incidental take permit authorizing the take of listed and candidate species that is incidental to an otherwise lawful activity, subject to specified conditions.

Sections 3511, 4700, 5050, and 5515 (Fully Protected Species)

CDFW has designated 37 fully protected species and prohibited the take or possession of these species at any time, and no licenses or permits may be issued for their take except for necessary scientific research or relocation of certain bird species for the protection of livestock.

Sections 3503, 3503.5, and 3513 (Nesting Bird Protections)

Section 3503 of the Fish and Game Code states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by code or any regulation made in accordance with the code. Section 3503.5 prohibits the take, possession, or needless destruction of any nests, eggs, or birds in the orders Falconiformes (New World vultures, hawks, eagles, ospreys, and falcons, among others) or Strigiformes (owls). Section 3513 prohibits the take or possession of any migratory nongame bird or part thereof, as designated in the MBTA. To avoid violation of the take provisions, projects are generally required to reduce or eliminate disturbances at active nesting territories during the nesting cycle.

Section 1600 et seq. (Lake and Streambed Alteration)

Section 1600 et seq. of the Fish and Game Code establishes the Lake and Streambed Alteration Program to provide for protection and conservation of fish and wildlife resources with respect to any project that may substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of any river, stream, or lake.

Under the program, an applicant must notify and enter into an agreement with CDFW before undertaking any activity that would substantially divert or obstruct the natural flow of any river, stream, or lake; or would substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake; or would deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake.

CDFW typically interprets its jurisdiction under Section 1600 to include the bed and bank of lakes and stream, as well as the adjacent floodplain and riparian vegetation, if present.

Sections 1900-1913 (California Native Plant Protection Act)

The California Native Plant Protection Act requires all State agencies to use their authority to carry out programs to conserve endangered and rare native plants. Provisions of this act prohibit the taking of listed plants from the wild and require notification, by the land owner undertaking a land use change action, of the CDFW at least 10 days in advance of that land use change on lands in California. This allows CDFW to salvage listed plant species that otherwise would be destroyed.

Local and Regional Laws and Plans

Within California, numerous regional, county, and city ordinances and policies exist for the protection of biological resources. Examples include ordinances and local zoning that specify setbacks for wetlands, streams, and lakes and regulate the removal of trees. Because of the broad geographic scope of the Proposed Program and the programmatic scope of this PEIR, local ordinances and land use designations, it was not feasible to specifically consider individual ordinances and policies in this analysis. **Appendix E** identifies local ordinances that address commercial cannabis cultivation.

4.4.3 Environmental Setting

Activities conducted under the Proposed Program would occur in locations across the State at new and established cannabis cultivation sites. As discussed in Section 4.0, *Introduction to the Environmental Analysis*, cannabis cultivation site construction and development activities would occur prior to application to the Proposed Program and therefore are not considered as part of the Proposed Program. For this reason, Proposed Program activities would generally not be conducted in previously undisturbed areas, although such areas may be present adjacent to Proposed Program activities.

Ecoregions

The geographic scope of the Proposed Program encompasses the entire state. California is divided into eight regions according to physiographic characteristics (e.g., topography and hydrography) (Bunn et al. 2007). The descriptions of these regions, presented below, address the general physical landscape (Figure 4.4-1) and major stressors affecting wildlife and habitats within each of the following eight regions:

- Mojave Desert Region,
- Colorado Desert Region,
- South Coast Region,
- Central Coast Region,
- North Coast–Klamath Region,
- Modoc Plateau Region,
- Sierra Nevada and Cascades Region, and
- Central Valley and Bay-Delta Region.

Full descriptions of each region are provided by Bunn et al. (2007), which, except as noted otherwise, was the source for the summaries presented below.

Mojave Desert Region

The 32-million-acre Mojave Desert extends into four states: California, Nevada, Arizona, and Utah. Most of the landscape is a moderately high plateau at elevations between 2,000 and 3,000 feet above mean sea level (amsl). Variations in topography, soil composition, and aspect largely account for habitat diversity. Aquatic, wetland, and riparian habitats are associated with seeps, springs, and ephemeral and perennial streams. Important perennial streams include the Amargosa and Mojave Rivers, as well as Surprise Canyon and Cottonwood Creek in the Panamint Range.

The federal government manages about 80 percent of the Mojave Desert Region in California. The largest land manager is the Bureau of Land Management (BLM), overseeing 8 million acres. The National Park Service (NPS) manages another 5 million acres, including the Mojave National Preserve and Death Valley and Joshua Tree National Parks. The U.S. Department of Defense manages five military bases that cover the remaining 2.5 million acres of federal land.

In contrast, the California State Park System and CDFW manage only 0.32 percent of the region.

Major stressors affecting wildlife and habitats in the Mojave Desert Region are multiple uses conflicting with wildlife on public lands, growth and development, solar energy development, fire, groundwater overdraft, loss of riparian habitat, inappropriate off-road vehicle use, excessive livestock grazing, excessive burro and horse grazing, invasive plants, nonnative fish, military lands management conflicts, illegal harvest or illegal commercialization, and mining operations.

Colorado Desert Region

The Colorado Desert Region consists of 7 million acres and extends from the Mojave Desert in the north to the Mexican border in the south, and from the Colorado River in the east to the Peninsular Ranges in the west. Most of the landscape lies below 1,000 feet amsl, but elevations range from 275 feet below sea level in the Salton Trough to nearly 10,000 feet amsl in the Peninsular Ranges. These mountain ranges block most coastal air, resulting in an arid climate. The region experiences higher summer daytime temperatures than those found in higher-elevation deserts, and seldom experiences frost. Precipitation occurs over two seasons, in winter and late summer. The common habitats of the Colorado Desert Region are creosote bush scrub; mixed scrub, including yucca (*Yucca* spp.) and cholla (*Opuntia* spp.) cactus; desert saltbush (*Atriplex polycarpa*); sandy soil grasslands; and desert dunes. Higher elevations are dominated by pinyon pine (primarily *Pinus monophylla*, *P. edulis,* and *P. quadrifolia*) and California juniper (*Juniperus californica*), with areas of manzanita (*Arctostaphylos* spp.) and Coulter pine (*P. coulteri*).

In the Colorado Desert Region's arid climate, aquatic and wetland habitats are uncommon but critical to wildlife. Springs and runoff from seasonal rains form alluvial fans, arroyos, fan palm oases, freshwater marshes, brine lakes, washes, ephemeral and perennial streams, and riparian vegetation communities dominated by cottonwood (*Populus* spp.), willow (*Salix* spp.), and invasive tamarisk (*Tamarix* spp.). The region's two largest water systems are the Salton Sea and the Colorado River.

The largest land manager of the region is BLM, overseeing 2.9 million acres. U.S. Department of Defense land accounts for 500,000 acres. Various other public landholdings occur around the Salton Sea. Slightly less than half of the Joshua Tree National Park lies within the Colorado Desert Region. Anza Borrego Desert State Park encompasses more than 600,000 acres. Santa Rosa Wildlife Area encompasses about 100,000 acres.

Although the Colorado Desert remains one of the least populated regions in California, human activities have had a substantial impact on the region's habitat and wildlife. Some of the greatest human-caused effects on the region have resulted from water diversions and flood control measures along the Colorado River. In addition, portions of the region are experiencing substantial growth and development pressures, most notably within the Coachella Valley.

Major stressors affecting wildlife and habitats in the Colorado Desert Region are water management conflicts and water transfer effects, inappropriate off-road vehicle use, loss and degradation of dune habitats, growth and development, solar energy development, and invasive species.

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Horizon WATER and ENVIRONMENT

Figure 4.4-1
Biological Regions in California (after Bunn et al., 2007)

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South Coast Region

The 8 million acres of California's South Coast Region extend along the coast from the middle of Ventura County in the north to the Mexican border in the south. Inland, the region is bounded by the Peninsular Ranges and the transition to the Mojave and Colorado Deserts on the east and by the Transverse Ranges on the north. The landscape varies from wetlands and beaches to hillsides, rugged mountains, arid deserts, and densely populated metropolitan areas. The region's coastal habitats include coastal strand, lagoons, and river-mouth estuaries that transition from riparian wetlands to freshwater and saltwater marshes. Inland, the predominant hillside and bluff communities are coastal sage scrub and chaparral. Low- to mid-elevation uplands often feature oak woodlands, while coniferous forests dominate higher-elevation mountainous areas.

The region's largest river drainages are the Tijuana, San Diego, San Luis Rey, Santa Margarita, Santa Ana, San Gabriel, Los Angeles, Santa Clara, and Ventura Rivers. Pine forests occur along the high-elevation stream reaches, and mountain drainages support southern mountain yellow-legged frog (*Rana mucosa*), California red-legged frog (*R. draytonii*), arroyo toad (*Bufo californicus*), arroyo chub (*Gila orcuttii*), Santa Ana sucker (*Catostomus santaanae*), and Santa Ana speckled dace (*Rhinichthys osculus* ssp.). In urbanized coastal areas, many sections of the region's river corridors are channelized with concrete.

Major stressors affecting wildlife and habitats in the South Coast Region are growth and development, water management conflicts and degradation of aquatic ecosystems, invasive species, altered fire regimes, and recreational pressures.

Central Coast Region

California's Central Coast Region encompasses 8 million acres, extending from the southern boundary of Los Padres National Forest north to the San Francisco Bay lowlands. Inland, the region is bounded on the east by the Diablo and Temblor Ranges. A rugged coastline characterizes the landscape, with small mountain ranges that roughly parallel the coast, river valleys with rich alluvial soils, and arid interior valleys and hills. Across the region, differences in climate, geography, and soils result in widely varying ecological conditions, supporting diverse coastal, montane, and desert-like natural communities. The region's coastal habitats include river-mouth estuaries, lagoons, sloughs, tidal mudflats, marshes, coastal scrub, and maritime chaparral. Coastal scrub and grasslands extend inland along river valleys. The outer Coast Ranges support mixed coniferous forests and oak woodlands.

The region's largest drainages are the Santa Ynez, Santa Maria, Carmel, Salinas, and Pajaro watersheds. The outer Coast Ranges, including the Santa Cruz and Santa Lucia Mountains, run parallel to the coastline.

Major stressors affecting wildlife and habitats in the Central Coast Region are population growth, expansion of intensive types of agriculture, invasions by exotic species, and overuse of regional water resources.

North Coast–Klamath Region

The 14-million-acre North Coast–Klamath Region extends along the Pacific coast from the Oregon-California border to the San Francisco Bay watershed. The region's inland boundary is formed by the Cascade Ranges along the north and the transition to the Sacramento Valley

in the south. The region is characterized by large expanses of rugged, forested mountains that range in elevation from 3,000 to more than 9,000 feet amsl. The climate features high precipitation in the coastal areas and dry conditions in some inland valleys. The region's coastal habitats include beaches, rocky shorelines, estuaries, lagoons, marshes, open-water bays, grasslands, coastal shrub, pine forests, mixed evergreen forests, and redwood forests. The inland ecological communities include moist forests dominated by Douglas fir (*Pseudotsuga menziesii*), ponderosa pine (*P. contorta*), and sugar pine (*P. lambertiana*) mixed with a variety of other conifers and hardwoods.

The region's major inland waterways are part of the Klamath River system, which includes the Klamath, Scott, Shasta, Salmon, and Trinity Rivers. River systems draining the Coast Ranges include the Eel, Russian, Mattole, Navarro, Smith, Mad, Little, and Gualala Rivers and Redwood Creek. Most of California's rivers with state or federal "wild and scenic river" designations are in the North Coast–Klamath Region, including portions of the Klamath, Trinity, Smith, Scott, Salmon, Van Duzen, and Eel Rivers.

Major stressors affecting wildlife and habitats in the North Coast–Klamath Region are water management conflicts, in-stream gravel mining, forest management conflicts, altered fire regimes, agriculture (including cannabis cultivation) and urban development, excessive livestock grazing, nonnative fishes, and invasive species. The introduction of nonnative fish to formerly fishless lakes and streams has substantially affected the aquatic life of the region, particularly in the subalpine and alpine ecosystems. Decades of stocking fish to create and maintain a recreational fishery have contributed to the decline of some native species in the region.

Modoc Plateau Region

The Modoc Plateau Region is framed by and includes the Warner Mountains and Surprise Valley along the Nevada border on the east and the edge of the southern Cascade Ranges on the west. The region extends north to the Oregon border and south to include the Skedaddle Mountains and the Honey Lake Basin. Elevations range from 4,000 to 5,000 feet amsl. The region is situated on the western edge of the Great Basin and supports high-desert plant communities and ecosystems similar to that region, including shrub-steppe, perennial grasslands, sagebrush, antelope bitterbrush, mountain mahogany, and juniper woodlands. Conifer forests dominate the higher elevations. Wetland, spring, meadow, vernal pool, riparian, and aspen communities are scattered throughout the rugged and otherwise dry desert landscape. The region's major waterway is the Pit River and its tributaries.

Sixty percent of the region is federally managed: the U.S. Forest Service manages 30 percent, BLM manages 26 percent, and USFWS and the U.S. Department of Defense each manage about 2 percent of the land in the region. CDFW manages 1 percent of the land, while about 37 percent is privately owned or belongs to municipalities.

The 3-million-acre Pit River watershed is the major drainage of the Modoc Plateau, providing 20 percent of the water to the Sacramento River. The upper reaches of the watershed are in creeks of the Warner Mountains that drain into Goose Lake. The north fork of the Pit River flows from Goose Lake southwest and merges with the south fork of the Pit River, which drains the southern Warner Mountains. Several endemic aquatic species, including Modoc sucker (*Catostomus microps*), Goose Lake redband trout (*Oncorhynchus mykiss* ssp.), Goose

Lake tui chub (*Gila bicolor* spp.), Goose Lake (Pacific) lamprey (*Lampetra tridentata*), and Shasta crayfish (*Pacifastacus fortis*), inhabit the watershed (Moyle 2002).

Creeks of the northern Modoc Plateau (or Lost River watershed) drain to Clear Lake. The outlet of Clear Lake is the Lost River, which circles north into Oregon farmland and then joins the Klamath River system. The Lost River watershed has its own endemic aquatic fish and invertebrates.

Major stressors affecting wildlife and habitats in the Modoc Plateau Region are excessive livestock grazing, excessive feral horse grazing, altered fire regimes, Western juniper (*Juniperus occidentalis*) expansion, invasive plants, forest management conflicts, and water management conflicts and degradation of aquatic ecosystems. The introduction of exotic aquatic species (e.g., largemouth bass [*Micropterus salmoides]* and nonnative trout to lakes, and bullheads [*Ameiurus* spp.], catfishes, and signal crayfish to rivers and streams) has reduced or extirpated populations of native amphibians and fish and affected invertebrates in many segments of the rivers, creeks, and lakes of the region.

Sierra Nevada and Cascades Region

The Sierra Nevada and Cascade Ranges form the spine of California's landscape, extending 525 miles from north to south. The southern Cascades extend from north of the Oregon border southeastward to Mount Lassen, where they merge with the Sierra Nevada Range. The Sierra Nevada Range extends south to the Mojave Desert, where it curves south to link with the Tehachapi Mountains. The region includes oak woodland foothills on the western slope of the Sierra Nevada and Cascade Ranges and, on the east, the Owens Valley and edges of the Great Basin. On the west side, elevations gradually increase from near sea level at the floor of the Central Valley to ridgelines ranging from 6,000 feet amsl in the north to 14,000 feet amsl in the south. The east slope of the Sierra Nevada drops off sharply, and the east side of the Cascade Range slopes gradually. As elevations increase from west to east, habitats transition from chaparral and oak woodlands to lower-level montane forests of ponderosa and sugar pine to upper montane forests of firs, Jeffrey pine (*P. jeffreyi*), and lodgepole pine and, above timberline, to alpine plant communities.

Sixty-one percent of the Sierra Nevada and Cascade Ranges are managed by federal agencies: the U.S. Forest Service manages 46 percent, the National Park Service manages 8 percent, and BLM manages 7 percent. State parks and wildlife areas account for 1 percent of the region, while the remaining area is privately owned.

The hundreds of creeks and streams on the western slope of the Sierra Nevada and Cascade Ranges drain via major river basins to merge with the Sacramento River in the north and the San Joaquin River in the south. The southernmost streams drain into the Tulare Basin via the Kings, Kaweah, Tule, and Kern Rivers, while the streams east of the Sierra Nevada crest drain into the Great Basin via the Lahontan, Mono, and Owens River drainages. Many of the creeks and streams of northeastern California drain to the Pit River, which joins the Sacramento River at Lake Shasta.

There are 67 aquatic habitat types in the region. Major riparian habitats include valley foothill riparian, montane riparian, wetland meadow, and aspen. Numerous invertebrate and vertebrate species are associated with these moist habitats. Other wildlife species, including some raptors and numerous songbirds, live in drier plant communities and rely on nearby

aquatic and riparian habitats for hunting, foraging, cover, and resting. Of the 67 aquatic habitat types, nearly two-thirds are in decline. Ecosystem functions have been disrupted in thousands of riparian areas, and more than 600 miles of river habitat have been submerged under reservoirs.

Major stressors affecting wildlife and habitats in the Sierra Nevada and Cascades Region are growth and land development, forest management conflicts, altered fire regimes, excessive livestock grazing, invasive plants, recreational pressures, climate change, and introduced nonnative fish.

Central Valley and Bay-Delta Region

The Central Valley and Bay-Delta Region comprises most of the low-lying lands of central California. Forty percent of the state's water falls as either rain or snow over much of the northern and central parts of the state and drains into the Sacramento or San Joaquin Rivers, which feed into the Sacramento–San Joaquin Delta (Delta). The Delta and the San Francisco Bay together form California's largest estuary (1,600 square miles of waterways). The region has four subregions, each with its own unique climate, topography, ecology, and land use: the San Francisco Bay Area, the Delta, the Sacramento Valley, and the San Joaquin Valley.

The San Francisco Bay Area is the second most densely populated area of the state of California, after the southern California metropolitan region. The region consists of low-lying baylands, aquatic environments, and watersheds that drain into the San Francisco Bay. The region is bounded on the east by the Delta, on the west by the Pacific Ocean, on the north by the North Coast–Klamath Region, and on the south by the Central Coast Region. Low coastal mountains surround the region, with several peaks rising above 3,000 feet amsl. The climate is characterized by relatively cool, often foggy summers and cool winters. The area receives 15–25 inches of rain annually from October to April, leaving most of the smaller streams dry by the end of summer. The topography of the San Francisco Bay Area allows for a variety of habitats, including deep and shallow estuarine environments in the bay itself. The bay also supports many marine species. Along the shoreline are coastal salt marshes, coastal scrub, tidal mudflats, and salt ponds. Ninety percent of the surface water from the Sacramento and San Joaquin Rivers and their tributaries is received through the Delta. Other major river drainages are the Napa and Petaluma Rivers and Sonoma, Petaluma, and Coyote Creeks.

The Great Central Valley contains the Sacramento Valley, the San Joaquin Valley, and the Delta. Together they form a vast, flat valley, approximately 450 miles long and averaging 50 miles wide, with elevations almost entirely below 300 feet amsl. The Sutter Buttes (2,000 feet) are the only topographic feature that exceeds that height. The Central Valley is surrounded by the Sierra Nevada on the east, the Coast Ranges on the west, the Tehachapi Mountains on the south, and the Klamath and Cascade Ranges on the north. The Central Valley has hot, dry summers and foggy, rainy winters. Annual rainfall averages 5–25 inches, with the least rainfall occurring in the southern portions and along the west side (in the rain shadow of the coastal mountains). Agriculture dominates land use in the Central Valley. The major natural upland habitats are annual grassland, valley oaks on floodplains, and vernal pools on raised terraces.

The Delta is a low-lying area that contains the tidally influenced portions of the Sacramento, San Joaquin, Mokelumne, and Cosumnes Rivers. The Delta was once an extensive brackish

marsh formed by the confluence of the Sacramento and San Joaquin Rivers, but has been extensively diked and drained for agriculture, flood protection, and water supply.

The Sacramento Valley contains the largest river in the state, the Sacramento River. Along with its numerous tributaries, the Sacramento River supports winter-run, spring-run, and fall-/late fall–run Chinook salmon (*Oncorhynchus tshawytscha*) populations; steelhead (*O. mykiss*); green sturgeon (*Acipenser medirostris*); and hardhead (*Mylopharodon conocephalus*). The lower 180 miles of the river are contained by levees, and excess floodwaters are diverted into large bypasses to reduce risks to human populations.

The San Joaquin Valley has two distinct, or separate, drainages. In the northern portion, the San Joaquin River flows north toward the Delta. It captures water from the Stanislaus, Tuolumne, and Merced Rivers and supports fall-/late fall–run Chinook salmon, steelhead, and hardhead populations. The southern portion of the valley is isolated from the ocean and drains to the closed Tulare Basin, except in very wet years when the Tulare Basin overflows to the San Joaquin River. Lakes and vast wetlands in this region are now dry most of the time because water has been dammed and diverted for agriculture.

Major stressors affecting wildlife and habitats in the Central Valley and Bay-Delta Region are urban, residential, agricultural, and solar energy growth and development; water management conflicts; water pollution; invasive species; and climate change.

Wildlife Habitats

The California Wildlife Habitat Relationships system classifies and describes the major wildlife habitat types that occur in the state. At present, 59 habitat types have been classified (Mayer and Laudenslayer 1988). Because the geographic scope of the Proposed Program encompasses the entire state, cannabis cultivation has the potential to occur in any of these habitats.

Special-status Species

Special-status species include plant and animal species protected under the ESA, CESA, the California Fish and Game Code, and the California Native Plant Protection Act, as well as those that are considered rare, threatened, or endangered under Sections 15380 and 15125 of the California Environmental Quality Act (CEQA) Guidelines. Special-status species are classified as follows:

Federal endangered (FE): species designated as endangered under the ESA. An FE species is one that is in danger of extinction throughout all or a substantial portion of its range. Take of any individual of an FE species is prohibited except with prior authorization from USFWS or NMFS.

Federal threatened (FT): species designated as threatened under the ESA. An FT species is one that is likely to become endangered in the foreseeable future throughout all or a substantial portion of its range. At the discretion of USFWS or NMFS, take of any individual of an FT species may be prohibited or restricted.

Federal proposed (FP): species that have been proposed by USFWS or NMFS for listing as endangered or threatened under the ESA. Federal proposed species must be evaluated in Section 7 consultation for any federal action (described in Section 4.4.2, "Regulatory Setting,"

under "Federal Laws, Regulations, and Standards – Endangered Species Act – Section 7") and normally are evaluated in the National Environmental Policy Act review of any action that may affect the species.

State endangered (SE): species designated as endangered under the CESA. These include native species or subspecies that are in serious danger of becoming extinct throughout all or a substantial portion of its range resulting from one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease (CESA Section 2062). Take, as defined by Section 86 of the Fish and Game Code, of any State-listed endangered species is prohibited, except as authorized by CDFW.

State threatened (ST): species designated as threatened under the CESA. These include native species or subspecies that, although not threatened currently with extinction, are likely to become an endangered species in the foreseeable future in the absence of special protection and management efforts (CESA Section 2067). Take, as defined by Section 86 of the Fish and Game Code, of any State-listed threatened species is prohibited, except as authorized by CDFW.

State candidate (SC): species designated as a candidate for listing under the CESA. These are native species or subspecies for which the Fish and Game Commission has accepted a petition for further review under Section 2068 of the CESA, finding that sufficient scientific information exists to indicate that the petitioned action may be warranted. Take of any State-designated candidate species, as defined by Section 86 of the Fish and Game Code, is prohibited, except as authorized by CDFW.

State Species of Special Concern (SSC): a species, subspecies, or distinct population of a vertebrate animal native to California that has been determined by CDFW to warrant protection and management, intended to reduce the need to give the species formal protection as an SE, ST, or SC species. SSC is an administrative designation and carries no formal legal status. Generally, SSC should be included in an analysis of project impacts if they can be shown to meet the criteria of sensitivity outlined in Section 15380 of the State CEQA Guidelines. However, some older lists of SSC were not developed using criteria relevant to CEQA, and the information used in generating those lists is out of date. Therefore, the current circumstances of each unlisted SSC must be considered against those criteria and not automatically assumed to be rare, threatened, or endangered.

State Fully Protected (FP): species designated as fully protected under Section 3511, 4700, 5050, or 5515 of the Fish and Game Code. FP species may not be taken at any time unless authorized by CDFW for necessary scientific research, which cannot include actions for project mitigation. Necessary scientific research includes efforts to recover populations of FP, SE, and ST species. A notification must be published in the California Regulatory Notice Register prior to CDFW authorizing take of FP species. Although some species included under these statutes also are listed as threatened, endangered, or SSC, others are not.

California Rare Plant Rank (CRPR): The CNPS Inventory of Rare, Threatened, and Endangered Plants identifies groups of species that are commonly recognized as special-status plants. Rank 1A plants are presumed extinct in California. Rank 1B plants are considered rare, threatened, or endangered in California and elsewhere. Rank 2 plants are rare, threatened, or endangered in California but more common elsewhere. Rank 3 species are plants about which more information is needed to place them in one of the three other

rankings; Rank 3 is considered a review list. Rank 4 species are plants of limited distribution, and Rank 4 is considered a watch list.

Sensitive Natural Communities

Sensitive natural communities are those communities identified as sensitive by CDFW on a list maintained by CDFW [California Department of Fish and Game 2010]), natural communities that are specifically regulated under Section 1600 of the California Fish and Game Code, and wetlands and other special aquatic sites regulated under Section 404 of the Clean Water Act.

Sensitive natural communities are located in every county of California. CDFW's classification uses the National Vegetation Classification hierarchy (Federal Geographic Data Committee 2008), which groups the natural communities in California into the following six major categories:

- Mesomorphic Tree Vegetation (e.g., blue oak woodland, willow riparian forest, bristlecone pine woodland)
- Mesomorphic Shrub and Herb Vegetation (e.g., serpentine bunch grass, vernal pools, California poppy fields)
- Xeromorphic (Semi-Desert) Scrub and Herb Vegetation (e.g., Joshua tree woodland, giant coreopsis scrub)
- Cryomorphic (Polar and High Montane Vegetation) Shrub and Herb Vegetation (e.g., Southern California Fell Field)
- Hydromorphic Vegetation (Aquatic Vegetation) (e.g., seasonal wetlands, yellow pond-lily mats)
- Lithomorphic Vegetation (Nonvascular and Sparse Vascular Rock Vegetation) (e.g., active desert dunes)

Baseline Conditions of Cannabis Cultivation in California

The approach to baseline conditions in this analysis is described in Section 4.0.3, "Environmental Baseline of Analysis." Existing, unpermitted and/or illegal cannabis cultivation across the state is believed to adversely affect biological resources through water diversions, pesticide poisoning of wildlife, transport of pollutants to waterways, noise impacts, vegetation clearing, and nighttime light impacts. The potential for impacts on biological resources varies tremendously based on the setting of the cultivation operation (Zuckerman 2013). The environmental impacts associated with unpermitted cannabis cultivation appear substantial but have been difficult to quantify, in part because cultivation is clandestine and often occurs on private property (Bauer et al. 2015). Factors such as abundant grow sites clustered in steep locations far from developed roads, potential for substantial water consumption, and close proximity to habitat for threatened species all point toward high risk of adverse ecological consequences associated with cannabis agriculture as it is currently practiced in northern California (Butsic and Brenner 2016). These adverse effects vary based on site-specific conditions and are not uniform across the state, but they do contribute to cumulative conditions; see Chapter 6, *Cumulative Considerations*, for more discussion.

4.4.4 Impact Analysis

This discussion describes the methodology and significance criteria that apply to analysis of biological resources. It also presents the analysis of the potential environmental impacts of the Proposed Program, and identifies applicable environmental protection measures.

Methodology

Cannabis cultivation activities that would be licensed under the Proposed Program are evaluated as a function of the following factors:

- Location of the activity;
- Intensity, frequency, and duration of the activity;
- The mechanism(s) by which the activity could reasonably affect, either directly or indirectly, sensitive biological resources; and
- The effectiveness of existing regulatory requirements that would apply to Proposed Program activities (see Section 4.4.2, "Regulatory Setting").

Proposed Program activities were evaluated to determine their potential to affect the following categories of sensitive biological resources:

- Special-status species,
- Sensitive natural communities (including aquatic natural communities),
- Movement of native fish or wildlife species, and
- Use of native wildlife nursery sites.

Potential effects on these resources were evaluated within geographic areas or ecoregions where Proposed Program activities may take place and where biological impacts are reasonably foreseeable.

Significance Criteria

For the purposes of this analysis, based on Appendix G of the State CEQA Guidelines, the Proposed Program would result in a significant impact related to biological resources if it would:

A. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS (special-status species);

B. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by CDFW or USFWS;

C. Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal

pool, coastal) through direct removal, filling, hydrological interruption, or other means;

D. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;

E. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or

F. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan.

Environmental Impacts of the Proposed Program

General Cultivation Impacts

Impact BIO-1: Cause adverse effects on aquatic and semi-aquatic special-status species. (Less than Significant)

General cultivation impacts include impacts of any type of cultivation activity: outdoor, mixed-light, indoor, nursery, and processing.

Because licensed cannabis cultivation operations could occur in habitats and locations throughout the state, there is potential for various special-status species to occur in proximity to cultivation operations. In general, most potential adverse effects on special-status species would occur during development of facilities used for cultivation, which are considered in this PEIR in Chapter 6, *Cumulative Considerations*. Therefore, this mechanism for impacts on biological resources is not considered further here.

Cultivation activities could affect aquatic and semi-aquatic special-status species through surface water withdrawals, erosion/sedimentation, and release of hazardous materials to water bodies (e.g., fuels, pesticides) during ongoing operations. The effects of pesticides on aquatic resources are considered in detail in Appendix F, *Human Health and Ecological Screening Risk Evaluation.*

Baseline conditions for cannabis cultivation are described in Section 4.4.3, "Environmental Setting," above, and are relevant to consider here. The primary concerns related to adverse effects on aquatic and semi-aquatic special-status species arise from unpermitted/illegal cultivation, because these operations have been documented to frequently be out of compliance with applicable regulatory requirements. However, cultivation that complies with existing State and local requirements may still have these effects.

As described in Section 4.8, *Hydrology and Water Quality*, water demand for cannabis cultivation has the potential to divert substantial portions of streamflow in watersheds in which cannabis cultivation operations are located. Diminished streamflow could adversely affect migratory fish and other aquatic species, as well as the wildlife and fish species that depend upon them as food sources. Streamflow reductions can have lethal or sublethal effects on aquatic species such as Coho salmon (*Oncorhynchus kisutch*), steelhead (*O. mykiss*), and sensitive amphibians such as the southern torrent salamander (*Rhyacotriton variegatus*) and

coastal tailed frog (*Ascaphus truei*) (Bauer et al. 2015, CDFW 2015, The Nature Conservancy 2015).

Diversion of water can also reduce water quality and result in changes in water temperature, dissolved oxygen content, and sedimentation. Increased water temperatures reduce growth rates in salmonids, increase predation risk, and increase susceptibility to disease. Warmer water also holds less dissolved oxygen, which can reduce survival in salmonids and other aquatic life. The threat of water diversion and outright loss of flow from headwater streams as a result of cannabis cultivation has not been well documented in the amphibian conservation literature, but has been observed in locations such as the headwaters of the Llagas Creek (Santa Clara County), a watershed that provides habitat for rare amphibian species such as foothill yellow-legged frog (*Rana boylii*), California red-legged frog (*R. draytonii*), and California tiger salamander (*Ambystoma californiense*) (Horizon et al. 2014).

Increased sedimentation as a result of water diversions can decrease spawning areas for many fish, destroy habitats for macroinvertebrates upon which many fish species depend for food, and deplete oxygen levels. Pesticides, fertilizers, other harmful chemicals, and garbage located in and around cannabis cultivation sites have the potential to enter waterways through runoff, killing fish and polluting water supplies.

While such impacts are of concern under the baseline, and for unpermitted cultivation after the Proposed Program is implemented, MCRSA and AUMA, as well as the CDFA's proposed regulations for MCRSA, require that cannabis cultivation licensees must comply with all applicable laws and regulations, which would reduce or avoid the potential for such adverse effects.

To begin with, licensees must comply with Section 1602 of the Fish and Game Code, or receive written verification from CDFW that a streambed alteration agreement is not required, before their cultivation license from CDFA would become effective. Licensees must also comply with CESA. CESA prohibits take of a candidate, threatened, or endangered species, or any part or product thereof, except as provided in CESA, including as set forth in Fish and Game Code Section 2081(b). Under Section 2081(b), a person may obtain a permit from CDFW that authorizes the incidental take of a species, subject to the legal standards set forth in that section.

These two regulatory programs (the Lake and Streambed Alteration Program and CESA) have already been described in Section 4.4.2, "Regulatory Setting," above. However, because of their importance in reducing or avoiding potentially significant impacts on biological resources, their framework and the typical protective measures that they would require are described further here.

Fish and Game Code Section 1602. Under Fish and Game Code Section 1602, an entity may not begin a project that will change the flow or the bed, channel, or bank of a river, stream, or lake without first notifying CDFW about the project ("notification") and, if necessary, obtaining a Lake or Streambed Alteration Agreement from CDFW.

If, after CDFW receives a notification, CDFW determines that the project described therein may have a substantial adverse effect on an existing fish and wildlife resource, CDFW will prepare a draft Lake or Streambed Alteration Agreement that includes measures CDFW has

determined are necessary to protect the resource the project may affect (Fish and Game Code Sections 1602, 1603.)

"Fish and wildlife" as used in Fish and Game Code Section 1600 et seq., includes fish and wildlife as defined in Fish and Game Code Sections 45 and 89.5, respectively. Specifically, "[f]ish means a wild fish, mollusk, crustacean, invertebrate, amphibian, or part, spawn, or ovum of any of those animals" (Fish and Game Code Section 45). "Wildlife means and includes all wild animals, birds, plants, fish, amphibians, reptiles and related ecological communities, including the habitat upon which the wildlife depends for its continued viability" (Fish and Game Code Section 89.5). Hence, CDFW will include in a Lake or Streambed Alteration Agreement protective measures to protect any plant or animal species a project may adversely affect, rather than only "special-status" species, and any habitat a project may adversely affect. Examples of such protective measures are provided below.

In determining whether a project may have an adverse effect on a fish or wildlife resource, CDFW considers both direct and indirect potential effects.

CESA. Section 2080 of the Fish and Game Code prohibits the take of any species that is state listed as endangered or threatened, or designated as a candidate for such listing. "Take" is defined by Section 86 of the Fish and Game Code as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill" an individual of a listed species (Fish and Game Code Section 86). Under CESA, CDFW may issue an incidental take permit authorizing the take of listed and candidate species that "is incidental to an otherwise lawful activity," provided that "the impacts of the take will be minimized and fully mitigated by including measures in the permit that can be successfully implemented, the applicant ensures adequate funding to implement these measures, and issuance of the permit will not jeopardize the continued existence of the species" (Fish and Game Code Section 2081[b]).

Activities Subject to Fish and Game Code Section 1602 and CESA, and Typical Impacts and Required Protection Measures. Examples of activities that may require notification under Fish and Game Code Section 1602 or may cause prohibited take under CESA include the following: diverting water from a river or stream to a storage tank or directly to the cultivation site; maintaining and repairing roads, stream crossings, and irrigation facilities; and managing vegetation.

Common types of impacts on fish and wildlife resources associated with such operation-related activities include a decrease in water quality, flows, and depth; dewatering a stream or parts of a stream; the introduction of or increase in invasive species; interference with breeding, nesting, and wildlife movement; reduction or elimination of nesting and foraging habitat; and the direct loss of fish and wildlife species.

Common types of protection measures CDFW may require include establishing maximum diversion flow rates; establishing minimum bypass rates; limiting water diversions to specific time periods or seasons; maintaining screens for diversions; requiring best management practices to control erosion; establishing decontamination protocols for vehicles; requiring programs to eradicate or control invasive species; requiring bird nesting and plant surveys; establishing buffers around active bird nests; protection of on-site or off-site compensatory habitat; short- and long-term funding; and establishing monitoring and reporting requirements.

These requirements would be protective of riparian and other aquatic habitat potentially affected by cannabis cultivation activities. In particular, the streambed alteration agreement would include requirements to protect water bodies and the species that inhabit them.

Second, licensees must comply with SWRCB requirements related to use of surface water. As part of evaluating and approving a water diversion, SWRCB must take into account all prior water rights and the availability of water in the water body, as well as the flows needed to preserve instream beneficial uses, such as recreation and fish and wildlife habitat (SWRCB 2016). Surface diversions typically include a bypass flow requirement (i.e., a flow level below which diversion must cease). SWRCB typically considers the habitat needs of special-status species, such as fish passage requirements, in determining whether water is available for diversion and establishing the required bypass flows.

In addition, new guidelines in development under Business and Professions Code Section 19332(d) state:

> Pursuant to Section 13149 of the Water Code, the State Water Resources Control Board, in consultation with the Department of Fish and Wildlife and the Department of Food and Agriculture, shall ensure that individual and cumulative effects of water diversion and discharge associated with cultivation of cannabis do not affect the instream flows needed for fish spawning, migration, and rearing, and the flows needed to maintain natural flow variability.

The newly drafted Water Code Section 13149(a)(1)(A) states:

> The board, in consultation with the Department of Fish and Wildlife, shall adopt principles and guidelines for diversion and use of water for cannabis cultivation in areas where cannabis cultivation may have the potential to substantially affect instream flows. The principles and guidelines adopted under this section may include, but are not limited to, instream flow objectives, limits on diversions, and requirements for screening of diversions and elimination of barriers to fish passage. The principles and guidelines may include requirements that apply to groundwater extractions where the board determines those requirements are reasonably necessary for purposes of this section.

The existing process established by the SWRCB, along with the principles and guidelines that will be established specific to water diversions for cannabis cultivation, are anticipated to be adequately protective of instream flows such that water diversions would not result in substantial adverse impacts on aquatic and semi-aquatic special-status species.

In addition, the SWRCB is in the process of developing a policy that will be incorporated into the aforementioned principles and guidelines to ensure that discharges from cannabis cultivation sites (e.g., sediment and other contaminants) do not adversely affect beneficial uses such as habitat for special-status aquatic and semi-aquatic species. In the interim period, while the SWRCB is developing this new policy for cannabis cultivation, cultivators with potential for discharges to waters of the State would be required to obtain waste discharge requirements from the relevant RWQCB and implement relevant requirements, including best management practices for sediment and erosion control, chemical storage, and riparian and wetland protection. The RWQCBs for the North Coast and Central Valley Regions have already adopted general orders for this purpose. In other regions, individual operators would need to obtain individual waste discharge requirements. Compliance with these regulatory requirements would minimize discharges of sediment and other contaminants to surface

water to a degree that such discharges would not result in substantial adverse impacts on aquatic and semi-aquatic special-status species.

Finally, cultivators (including those already operating under baseline conditions) would need to adhere to other relevant regulations, including CESA and portions of the Fish and Game Code related to Fully Protected Species, and compliance with these regulations would further protect aquatic and semi-aquatic special-status species.

Compliance with these various requirements would be sufficient to ensure that substantial adverse effects on these species would not result from cannabis cultivation operations. In addition, as part of the application process, CDFA, would consider site-specific information related to the cultivation site to evaluate whether significant impacts could occur at a particular location that have not been addressed through these regulatory requirements. To the extent that significant impacts are possible that have not been considered in this PEIR, a site-specific CEQA document would be required, for instance as part of the approval process undertaken by the local agency and/or other responsible agencies, or if no other lead agency exists, CDFA.

For these reasons, impacts would be **less than significant**.

Impact BIO-2: Cause substantial adverse effects on special-status plant species. (Less than Significant)

Special-status plants could be adversely affected by erosion and sedimentation, trampling, fertilizer runoff from cultivation activities, or misapplication or drift of herbicides used on cultivation sites. Severe erosion or sedimentation could dislodge or bury special-status plants, and fertilizer runoff could adversely affect special-status plants that are adapted to low-nutrient conditions. As described in Impact BIO-1, licensees would be required to comply with multiple regulatory requirements associated with the Porter-Cologne Water Quality Control Act, Fish and Game Code Section 1602, the CESA, and the California Native Plant Protection Act. These requirements would include best management practices such as control of sediment, erosion, and discharges of fertilizer runoff.

Because cultivation sites would have already been developed before beginning operation, it is unlikely that they would contain special-status plant species that could be trampled.

In addition, cultivators would be required to comply with Sections 8313(e) and (f) of the proposed regulations, which require compliance with pesticide laws and regulations (including those related to herbicides) as enforced by CDPR, and for any herbicides exempt from registration requirements, licensees must comply with all herbicide label directions, store chemicals in a secure building or shed, contain any chemical leaks and immediately clean up any spills, apply the minimum amount of product necessary to control the target pest (in this case a plant), and prevent off-site drift. This should minimize the potential for herbicides to result in non-target effects on special-status plant species.

Finally, as part of the application process, individual cultivation sites will be evaluated to determine whether significant impacts could occur at a particular location that have not been addressed through these regulatory requirements. To the extent that significant impacts are possible that have not been considered in this PEIR, a site-specific CEQA document would be

required as part of the approval process undertaken by the local agency and/or other responsible agencies (including, potentially, CDFA).

As a result, any effects on special-status plant species are not expected to be substantial. This impact would be **less than significant**.

Impact BIO-3: Cause substantial adverse effects on wildlife due to increased light, including special-status terrestrial wildlife species. (Less than Significant)

All types of cultivation operations may result in increased nighttime light compared to baseline conditions. As discussed in Chapter 3, *Proposed Program Activities*, cultivation operations typically use some form of security system, which may include outdoor security lighting surrounding cultivation sites. Mixed-light operations may also use lighting at night to extend the photoperiod for the cannabis plants, which also could result in light trespass issues.

Increased nighttime light is known to have adverse effects on nocturnal wildlife species, such as bats, nocturnal birds, and nocturnal mammals. Special-status nocturnal species such as Townsend's big eared bat (*Corynorhinus townsendii*) or San Joaquin kit fox (*Vulpes macrotis mutica*) could be affected. Adverse effects could include changes in animal behavior such as disorientation and being repelled or attracted to the artificial light, which could affect foraging, reproduction, communication, and other critical behaviors (Longcore and Rich 2004). These effects vary across species (Health Council of the Netherlands 2000). Nighttime artificial light can also result in disruption of biological rhythms (i.e., circadian rhythms) as well as change in habitat quality (Health Council of the Netherlands 2000). These impacts would be potentially significant.

The Proposed Program regulations contain environmental protection measures that would require security lighting at grow operations to be selectively placed and shielded to minimize the effects of the lighting (Section 8313[b]), and would require mixed-light operations to eliminate any nighttime light trespass (Section 8314). In addition, to the extent they are required, a Lake or Streambed Alteration Agreement and/or incidental take permit under CESA (as issued by CDFW) may include protective measures for such impacts. Additional description of the Lake and Streambed Alteration Program and CESA, their applicability to cultivation, and the typical protective measures imposed by CDFW pursuant to these regulatory programs, have been previously discussed in Section 4.4.2, "Regulatory Setting," and Impact BIO-1, above. With these measures in place, impacts of increased nighttime light on wildlife from the Proposed Program would not be substantial and this impact would be **less than significant**.

Impact BIO-4: Cause substantial adverse effects on special-status terrestrial wildlife species due to increased noise and human presence. (Less than Significant)

Cannabis cultivation operations would likely result in increased noise and human presence in some areas. Increased noise levels would reduce the distance and area over which acoustic signals could be perceived by animals. Adverse effects on wildlife from noise could include changes in foraging and antipredator behavior, reproductive success, population density, and community structure (Barber et al. 2010). Increased human presence, which is often coupled with increased noise, is also known to cause disturbance to wildlife (Barber et al. 2010).

For outdoor cultivation operations, the primary sources of noise could include irrigation pumps, diesel generators, various landscaping equipment (including chainsaws and/or mowers for the removal of outdoor trees and vegetation or the removal of cannabis stalks), vendor/equipment/water trucks, and worker vehicles. A heating, ventilation, and air conditioning system may also be used to control the climate within a structure for immature cannabis plants. Indoor and mixed-light cultivation operations would involve similar equipment, although chainsaws and mowers may be used less frequently in mixed-light operations and not at all for indoor operations. Nursery operations could involve use of any of these types of equipment, although chainsaws would be less frequently used due to the absence of mature cannabis plants requiring removal at the end of their growth cycle.

Some equipment would not be audible outside of enclosures, greenhouses, and buildings used for cultivation operations. The noise-generating equipment with the greatest potential to adversely affect wildlife would be chainsaws and mowers (for outdoor or mixed-light operations), trucks, and emergency generators. For more information on the levels of noise generated by these types of equipment, see Section 4.10, *Noise*.

In general, the noise generated by cannabis cultivation activities would be consistent with other land uses in the vicinity; for instance, chainsaws and mowers are commonly used in rural environments. As such, many wildlife species are anticipated to be habituated to the noise generated by cultivation. This would be particularly the case in urban and suburban settings.

The extent to which impacts could occur would be based on site-specific circumstances such as the characteristics of the individual cultivation operation and the species in proximity. To the extent that the noise and human activity associated with cultivation could result in take of listed species, the cultivator would be required to obtain incidental take coverage under the ESA or CESA. To the extent they are required, a Lake or Streambed Alteration Agreement and/or incidental take permit under CESA (as issued by CDFW) may include protective measures for such impacts. Additional description of the Lake and Streambed Alteration Program and CESA, their applicability to cultivation, and the typical protective measures imposed by CDFW pursuant to these regulatory programs, have been previously discussed in Section 4.4.2, "Regulatory Setting," and Impact BIO-1, above.

In addition, as part of review of applications, CDFA would consider site-specific information related to individual cultivation sites to evaluate whether significant impacts could occur at a particular location that would not be addressed through these regulatory requirements. To the extent that significant impacts are possible that have not been considered in this PEIR, a site-specific CEQA document would be required as part of the approval process.

For these reasons, noise and human activity associated with cannabis cultivation would not result in a substantial adverse impact on special-status wildlife species. This impact would be **less than significant.**

Impact BIO-5: Cause substantial adverse effects on riparian habitat, other sensitive natural communities, or federally protected wetlands. (Less than Significant)

Water diversion, runoff and sedimentation, and discharges of other contaminants could adversely affect riparian habitat, other sensitive natural communities, and federally protected wetlands adjacent to cultivation sites. As described in Impact BIO-1, existing

regulations and new regulatory programs specific to cannabis cultivation would be protective of aquatic habitats, including riparian areas and wetlands, by imposing limits on water diversions and requiring measures to minimize discharges to these habitats.

In addition, as part of the application process, CDFA would review site-specific information to determine whether significant impacts could occur at a particular location that would not be addressed through these regulatory requirements. To the extent that significant impacts are possible that have not been considered in this PEIR, a site-specific CEQA document would be required as part of the approval process. Finally, to the extent they are required, a Lake or Streambed Alteration Agreement and/or incidental take permit under CESA (as issued by CDFW) may include protective measures for such impacts. Additional description of the Lake and Streambed Alteration Program and CESA, their applicability to cultivation, and the typical protective measures imposed by CDFW pursuant to these regulatory programs, have been previously discussed in Section 4.4.2, "Regulatory Setting," and Impact BIO-1, above.

With adherence to applicable regulations and their associated requirements, as well as site-specific CEQA review when necessary, substantial adverse effects on riparian habitat, other sensitive natural communities, and federally protected wetlands would be **less than significant**.

Impact BIO-6: Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or wildlife corridor, or impede the use of native wildlife nursery sites. (Less than Significant)

As described in Impact BIO-1, the water rights process administered by SWRCB would ensure bypass flows that would be protective of fish migration needs and instream habitat, such as low-velocity refugia for immature fish.

With respect to upland species, cannabis cultivation operations under the Proposed Program would be of limited size (no larger than 1 acre), and therefore would typically not be large enough to substantially interfere with movement of wildlife. Even if multiple cultivation sites were located near one another, they would be unlikely to substantially impede wildlife movement because there would be separation between the cultivation sites. Indeed, many local jurisdictions have adopted setbacks or limits on the percentage of a parcel that can be dedicated to cannabis cultivation, allowing wildlife to pass through or around the area.

In addition, to the extent they are required, a Lake or Streambed Alteration Agreement and/or incidental take permit under CESA (as issued by CDFW) may include protective measures for such impacts. Additional description of the Lake and Streambed Alteration Program and CESA, their applicability to cultivation, and the typical protective measures imposed by CDFW pursuant to these regulatory programs, have been previously discussed in Section 4.4.2, "Regulatory Setting," and Impact BIO-1, above.

Finally, a site-specific evaluation of individual cultivation sites would be necessary to evaluate whether significant impacts could occur at a particular location. To the extent that significant impacts are possible that have not been considered in this PEIR, a site-specific CEQA document would be required as part of the approval process.

In conclusion, cannabis cultivation activities under the Proposed Program would not substantially interfere with the movement of any native fish or wildlife species or their use of nursery sites. This impact would be **less than significant**.

Impact BIO-7: Conflict with applicable habitat conservation plans or natural community conservation plans. (Less than Significant)

Because the Proposed Program would be implemented throughout the state, it is likely that some licensed cannabis cultivation facilities would be within an area covered by an HCP or natural community conservation plan (NCCP). The potential for conflicts would depend upon the species and activities covered by the HCP or NCCP, in the context of the individual cultivation activities; therefore, it is not possible at a statewide scale to definitively determine what conflicts could arise. However, in general, the greatest potential for conflicts with these plans would occur during development of new cultivation facilities, rather than during ongoing cultivation operations. Establishment of new facilities is discussed in Chapter 6, *Cumulative Considerations.*

To the extent that the local jurisdiction is a signatory to an HCP or NCCP and the cultivation activity is a covered activity in the HCP or NCCP, applicants may be required to adhere to applicable HCP/NCCP avoidance and minimization measures. Alternatively, the local jurisdiction may develop measures to avoid conflicts (for instance, in the event that the cultivation site is located in an area that has been identified for conservation under the HCP or NCCP).

As part of the application process, CDFA would review site-specific information to determine whether significant impacts could occur at a particular location. To the extent that significant impacts are possible that have not been considered in this PEIR, a site-specific CEQA document would be required as part of the approval process.

Because any conflicts with HCPs and NCCPs would be based on site-specific circumstances that are unknown at this time, and because any potential conflicts with HCPs or NCCPs would be need to be addressed before CDFA's issuance of a license, often at the local level, this impact would be **less than significant**.

Impact BIO-8: Conflict with local policies or ordinances protecting biological resources. (No Impact)

An applicant for a license must comply with all local ordinances and regulations, including those intended to protect biological resources. An applicant may provide documentation of compliance with local requirements to facilitate the application process. Thus, there would be **no impact**.

Impact BIO-9: Cause substantial adverse effects on wildlife due to pesticide use (besides rodenticides). (Less than Significant)

The potential for adverse effects on wildlife from the use of pesticides that may potentially be allowed for use for cannabis cultivation under the Proposed Program was evaluated in the *Human Health and Ecological Screening Risk Evaluation* prepared for the Proposed Program (**Appendix F** of this PEIR). No impacts on wildlife from use of pesticides at indoor cultivation sites are expected, as wildlife would not be present within these indoor environments—access to indoor cultivation sites would be highly restricted and the potential for inadvertent

release of pesticides outside an indoor cultivation site is low. However, for outdoor and mixed-light cultivation, wildlife could be present and, therefore, a mechanism exists whereby wildlife could become exposed to pesticides.

Although information on toxicity to wildlife was limited for many of the pesticides investigated, some pesticides evaluated had the potential to cause adverse effects on wildlife. However, the *Human Health and Ecological Screening Risk Evaluation* concluded that implementation of control measures would reduce the potential for adverse effects on wildlife. The recommendations from this evaluation were incorporated into the Proposed Program regulations, and consist of the following:

> Licensees must comply with pesticide laws and regulations as enforced by the Department of Pesticide Regulation. For all pesticides that comply with these laws and regulations, and are exempt from registration requirements, licensees shall comply with the following pesticide application and storage protocols:
>
> (1) Comply with all pesticide label directions;
>
> (2) Store chemicals in a secure building or shed to prevent access by wildlife;
>
> (3) Contain any chemical leaks and immediately clean up any spills;
>
> (4) Apply the minimum amount of product necessary to control the target pest;
>
> (5) Prevent offsite drift;
>
> (6) Do not apply pesticides when pollinators are present;
>
> (7) Do not allow drift to flowering plants attractive to pollinators;
>
> (8) Do not spray directly to surface water or allow pesticide product to drift to surface water. Spray only when wind is blowing away from surface water bodies;
>
> (9) Do not apply pesticides when they may reach surface water or groundwater; and
>
> (10) Only use properly labeled pesticides. If no label is available consult the Department of Pesticide Regulation.

Similar requirements are anticipated to be included in CDFA's AUMA regulations. As described in the *Human Health and Ecological Screening Risk Evaluation,* application of pesticides in compliance with these regulations and protocols would not result in substantial adverse effects on wildlife.

In addition to these requirements in CDFA's proposed regulations, MCRSA (Section 19332[b]) and AUMA (Section 26060[b]) require the California Department of Pesticide Regulation (CDPR) to develop guidelines and standards for the use of pesticides in cannabis cultivation operations, which may further reduce the potential for impacts.

Finally, to the extent they are required, a Lake or Streambed Alteration Agreement and/or incidental take permit under CESA (as issued by CDFW) may include protective measures for such impacts. Additional description of the Lake and Streambed Alteration Program and CESA, their applicability to cultivation, and the typical protective measures imposed by CDFW pursuant to these regulatory programs, have been previously discussed in Section 4.4.2, "Regulatory Setting," and Impact BIO-1, above.

With implementation of these protective measures, this impact would be **less than significant**.

Impact BIO-10: Cause substantial adverse effects on wildlife due to rodenticide use. (Less than Significant)

Some rodent species such as mice (*Mus* spp.), roof rats (*Rattus rattus*), and pocket gophers (*Thomomys* spp.) are known to be pests of cannabis operations (CDPR 2015). Impacts on non-target wildlife from use of rodenticides at indoor cultivation sites are not expected to be substantial, as wildlife would have limited access to poisoned rodent carcasses in these indoor environments. However, for outdoor and mixed-light cultivation, poisoned rodents could be consumed by wildlife and, therefore, a mechanism exists whereby wildlife could become exposed to rodenticides.

Unpermitted cannabis cultivation operations are known to use rodenticide in much higher concentrations than label instructions, and also to leave rodenticide at grow sites that are abandoned. Rodenticide has been found sprinkled at the base of plants, as well as along irrigation lines, to deter herbivory and chewing of lines (Gabriel et al. 2012). Large quantities of rodenticide have often been left behind once illegal cultivation sites are abandoned (Gabriel et al. 2012).

The use of rodenticides by cannabis cultivation operations has resulted in poisoning and death of Pacific fisher (*Martes pennanti*) in California (Warren 2015) and has affected other species that prey on rodents, such as the northern spotted owl (*Strix occidentalis caurina*) (Higley 2015). The southern Sierra evolutionarily significant unit of Pacific fisher is listed as threatened under CESA (CDFW 2016a). Northern spotted owl is a candidate species under CESA and is listed as threatened under the ESA (CDFW 2016a). Rodenticides can affect these species through both direct effects, such as poisoning, and indirect effects, such as depletion of prey populations (Gabriel et al. 2012). In two research projects, more than 80 percent of fishers tested positive for rodenticides (Gabriel et al. 2012, 2015, Thompson et al. 2014). These studies found that predation was the most common cause of death (ranging from 88 percent [Thompson et al. 2014] to 70 percent [Gabriel et al. 2015]), although it is possible that the depredated fishers were impaired by the rodenticides and that impairment might have contributed to being depredated. Of the 10 percent of fishers that died of toxicosis, all had trespass cannabis cultivation and associated toxicants within their home ranges. Exposed fishers had residues of up to five rodenticides identified, with an average of 1.79 found (Gabriel et al. 2015). Other forest-dwelling carnivores such as American and Humboldt martens (*Martes americana* and *M. americana humboldtensis*), bobcats (*Lynx rufus*), and black bears (*Ursus americanus*) have been exposed to toxicants in remote forested areas of California (Gabriel 2015). Northern spotted owls feed on a variety of prey species, but small mammals make up the majority of their diet. Thus, the main contaminant threat to the owls is intoxication from secondary rodenticide exposure (CDFW 2016b). Livers were tested from barred owls (*Strix varia*) collected in Humboldt and Del Norte Counties within the Northern California Coastal and Klamath Provinces, an area that overlaps the range of the northern spotted owl. Fifty percent of barred owls tested had been exposed to one or more second-generation anticoagulant rodenticides. Sources of exposure to these chemicals may include proper and improper use near human habitation and illegal use at cannabis cultivation sites (Higley 2015).

Rodenticide poisoning of fishers and owls has largely been from second-generation anticoagulant rodenticides (e.g., bromadiolone, brodifacoum, difenacoum, and difethalone) (Gabriel et al. 2015, Higley 2015). This type of rodenticide is more acutely toxic than other types of rodenticide and persists in tissues and in the environment (Gabriel et al. 2012). CDPR considers second-generation anticoagulant rodenticides restricted materials that are not labeled for field use and should never be used in or around cannabis cultivation sites (CDPR 2015). As the use of these rodenticides is prohibited by CDPR, cannabis cultivation operations would be prohibited from using them for cultivation activities under the Proposed Program. Thus, there would be no impact from these second-generation anticoagulant rodenticides under the Proposed Program.

In accordance with CDPR guidance, under the Proposed Program cannabis cultivation operations are only allowed to use the following repellants in and around cannabis cultivation sites to protect their crops from rodent herbivory: capsicum oleoresin (consistent with the label), putrescent whole egg solids, and garlic. Because these are repellants and not rodenticides, they have no potential for secondary poisoning of non-target species.

Finally, to the extent they are required, a Lake or Streambed Alteration Agreement and/or incidental take permit under CESA (as issued by CDFW) may include protective measures for such impacts. Additional description of the Lake and Streambed Alteration Program and CESA, their applicability to cultivation, and the typical protective measures imposed by CDFW pursuant to these regulatory programs, have been previously discussed in Section 4.4.2, "Regulatory Setting," and Impact BIO-1, above.

In conclusion, compared to the baseline condition, the Proposed Program would reduce the potential for adverse effects from rodenticide use by requiring that cannabis cultivation operations comply with CDPR guidance and other applicable requirements. This impact is therefore considered **less than significant**.

Impact BIO-11: Cause substantial adverse impact on nesting birds as a result of outdoor cultivation. (Less than Significant)

Indoor and mixed-light cultivation operations are not anticipated to have substantial adverse effects on nesting birds, as most activity would occur indoors or within greenhouses. However, for outdoor cultivation, as described in Impact BIO-4, increased noise and human presence at outdoor cannabis cultivation sites could adversely affect wildlife, including nesting birds. In particular, increased noise and human presence associated with chainsaw or truck use could result in adverse effects on birds, particularly during the nesting season. Several federal and State laws have been established to protect birds (e.g., MBTA; California Fish and Game Code Sections 3503, 3503.5, and 3513), with which licensees would be required to comply. Compliance with these regulatory requirements would reduce the potential for impacts on nesting birds.

In addition, to the extent they are required, a Lake or Streambed Alteration Agreement and/or incidental take permit under CESA (as issued by CDFW) may include protective measures for such impacts. Additional description of the Lake and Streambed Alteration Program and CESA, their applicability to cultivation, and the typical protective measures imposed by CDFW pursuant to these regulatory programs, have been previously discussed in Section 4.4.2, "Regulatory Setting," and Impact BIO-1, above.

That said, it is possible that site-specific impacts on nesting birds could occur. As part of the application process, CDFA would review site-specific information to evaluate whether significant impacts could occur at a particular location. To the extent that significant impacts are possible that have not been considered in this PEIR, a site-specific CEQA document would be required as part of the approval process undertaken by the local agency and/or other responsible agencies (including, potentially, CDFA). During preparation of these CEQA documents, the lead agency would conduct studies to identify whether nesting birds could be adversely affected by outdoor cannabis cultivation activities, and develop mitigation measures to reduce the potential for significant impacts. Therefore, issues regarding impacts on nesting birds would be addressed/resolved on a site-specific level, often well before the time the applicant applies for a license from CDFA under the Proposed Program.

Thus, impacts on nesting birds as a result of outdoor cultivation would be **less than significant**.

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4.5 Cultural Resources

4.5.1 Introduction

This section of the Program Environmental Impact Report (PEIR) presents the environmental setting and potential impacts of the California Department of Food and Agriculture's (CDFA's) CalCannabis Cultivation Licensing program (Proposed Program) related to cultural and paleontological resources.

Cultural resources include prehistoric archaeological sites, historic-era archaeological sites, historic-era buildings, structures, landscapes, districts, and linear features. Prehistoric archaeological sites are places where Native Americans lived or carried out activities during the prehistoric period, which in California, depending on the region, is generally defined as being before the arrival of Spanish explorers in 1542. Historic-era archaeological sites reflect the activities of people after initial exploration and settlement, depending on the region, beginning in the mid-1500s. Native American sites can also reflect the historic era. Prehistoric and historic-era sites contain artifacts, cultural features, subsistence remains, and human burials.

Tribal cultural resources (TCRs) are sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe. TCRs are given special status under California law, so although TCRs may include some of the resource types discussed in this section, they are addressed more thoroughly in Section 4.13, *Tribal Cultural Resources*.

Paleontological resources are the fossil remains of prehistoric flora and fauna, or traces of evidence of the existence of prehistoric flora and fauna. Because paleontological resources are not found in "soil" but are contained within the geologic deposits or bedrock that underlies the soil layer, cultivation activities would not typically encounter any paleontological resources, and this topic is not discussed further.

The following key data sources support this section:

- Information provided by the California Office of Historic Preservation;
- *Handbook of North American Indians*, Vol. 8, *California*, edited by R. F. Heizer (1978);
- *California Prehistory: Colonization, Culture, and Complexity*, edited by T. L. Jones and K. A. Klar (2010); and
- *Historic Spots in California*, revised by D. E. Kyle (2002).

4.5.2 Regulatory Setting

Federal Laws, Regulations, and Policies

National Historic Preservation Act

Projects that require federal permits, receive federal funding, or are located on federal lands must comply with 54 USC 306108, formally and more commonly known as Section 106 of the National Historic Preservation Act (NHPA). To comply with Section 106, a federal agency must "take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places [NRHP]." The implementing regulations for Section 106 are found in Title 36 of the Code of Federal Regulations (CFR), Part 800, as amended (2004).

The implementing regulations of the NHPA require that cultural resources be evaluated for NRHP eligibility if they cannot be avoided by an undertaking or project. To determine if a site, district, structure, object, and/or building is significant, the NRHP Criteria for Evaluation are applied. A resource is significant and considered a historic property when it:

A. Is associated with events that have made a significant contribution to the broad patterns of our history; or

B. Is associated with the lives of persons significant in our past; or

C. Embodies the distinctive characteristics of a type, period, or method of construction, or that represents the work of a master, or that possesses high artistic values, or that represents a significant and distinguishable entity whose components may lack individual distinction; or

D. Yields, or may be likely to yield, information important in prehistory or history.

In addition, 36 CFR Section 60.4 requires that, to be considered significant and historic, resources must also exhibit the quality of significance in American history, architecture, archaeology, engineering, or culture and must possess integrity of location, design, setting, materials, workmanship, feeling, and association.

Other "criteria considerations" need to be applied to religious properties, properties that are less than 50 years old, a resource no longer situated in its original location, a birthplace or grave of a historical figure, a cemetery, a reconstructed building, and commemorative properties. These types of properties are typically not eligible for NRHP inclusion unless the criteria for evaluation and criteria considerations are met.

For archaeological sites evaluated under criterion D, "integrity" requires that the site remain sufficiently intact to convey the expected information to address specific important research questions.

State Laws, Regulations, and Policies

CEQA and State CEQA Guidelines

Section 21083.2 of the California Environmental Quality Act (CEQA) (Public Resources Code [PRC] Section 21000 et seq.) requires that the lead agency determine whether a project or program may have a significant effect on unique archaeological resources. A unique

archaeological resource is defined in CEQA as an archaeological artifact, object, or site about which it can be clearly demonstrated that there is a high probability that it:

- Contains information needed to answer important scientific research questions, and there is demonstrable public interest in that information;
- Has a special or particular quality, such as being the oldest of its type or the best available example of its type; or
- Is directly associated with a scientifically recognized important prehistoric or historic event or person.

Measures to avoid, conserve, preserve, or mitigate significant effects on these resources are also provided in CEQA Section 21083.2.

Section 15064.5 of the State CEQA Guidelines (PRC Sections 15000 et seq.) notes that "a project with an effect that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment." Substantial adverse changes include physical changes to the historical resource or to its immediate surroundings, such that the significance of the historical resource would be materially impaired. Lead agencies are expected to identify potentially feasible measures to mitigate significant adverse changes in the significance of a historical resource before they approve such projects. Historical resources are those that are:

- Listed in, or determined to be eligible for listing in, the California Register of Historical Resources (CRHR) (PRC Section 5024.1[k]);
- Included in a local register of historic resources (PRC Section 5020.1) or identified as significant in an historic resource survey meeting the requirements of PRC Section 5024.1(g); or
- Determined by a lead agency to be historically significant.

State CEQA Guidelines Section 15064.5 also prescribes the processes and procedures found under California Health and Safety Code Section 7050.5 and PRC Section 5097.95 for addressing the existence of, or probable likelihood of, Native American human remains, as well as the unexpected discovery of any human remains within the project site. This includes consultation with the appropriate Native American tribes.

State CEQA Guidelines Section 15126.4 provides further guidance about minimizing effects on historical resources through the application of mitigation measures. Mitigation measures must be legally binding and fully enforceable.

The lead agency having jurisdiction over a project or program is responsible to ensure that paleontological resources are protected in compliance with the State CEQA Guidelines and other applicable statutes. Paleontological and historical resource management is also addressed in PRC Section 5097.5, Archaeological, Paleontological, and Historical Sites. This statute defines as a misdemeanor any unauthorized disturbance or removal of a fossil site or remains on public land and specifies that state agencies may undertake surveys, excavations, or other operations as necessary on State lands to preserve or record paleontological resources. This statute would apply to any impacts that would occur on State-owned or State-managed lands.

California Register of Historical Resources

PRC Section 5020.1(j) states that historical resources include "but [are] not limited to, any object, building, structure, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California." PRC Section 5024.1 establishes the CRHR. The register lists all California properties considered to be significant historical resources. The CRHR includes all properties listed in, or determined to be eligible for listing in, the NRHP, including properties evaluated under Section 106 of the NHPA. The criteria for listing are similar to those of the NRHP. Criteria for listing in the CRHR include resources that:

- Are associated with the events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
- Are associated with the lives of persons important in our past;
- Embody the distinctive characteristics of a type, period, region, or method of construction, or represent the work of an important creative individual, or possess high artistic values; or
- Have yielded, or may be likely to yield, information important in prehistory or history.

The regulations set forth the criteria for eligibility as well as guidelines for assessing historical integrity and resources that have special considerations.

Local Laws, Regulations, Plans, and Policies

Many city and county general plans contain goals, policies, and strategies related to cultural resources. Applicable policies and strategies from these general plans generally include requirements to identify cultural resources within a proposed project area through archival research and a field study, and to preserve any significant resources, if feasible. Mitigation is often required before a permit will be granted. Many cities and counties have appointed boards or committees to review projects that have the potential to affect cultural resources, but few have requirements to consult with Native American tribes about impacts on Native American sites or include Native Americans on their cultural resources review boards.

4.5.3 Environmental Setting

California Prehistory

Archaeologists study the physical evidence of past human behavior, called "material culture"; they look for changes in material culture over time and across geographic regions to reconstruct the past. Archaeological evidence currently indicates that people arrived in California around 13,000 years ago. Engaged in the hunting of large game and gathering of plant foods, these early nomadic groups entered the region not only by land, but also by sea, following the coastline in boats (Moratto and Chartkoff 2010). There is a minimal record of the earliest inhabitants, abut there is evidence that subsistence practices evolved over time from nomadic hunting and gathering to increased sedentism with greater intensification of resource exploitation. This was paired with changes in technology, such as relinquishing the

hunting spear for the bow and arrow, and exchanging handstones and millingstones for mortars and pestles.

The indigenous population grew as sedentism increased and resource availability stabilized, and as subsequent waves of migrants continued to arrive in the state, thereby leaving increased evidence (i.e., material culture) of human activity and changing human behavior. While gradual at first, growth among California's native populations became rapid in the period just before European incursion.

When systematic archaeological research began in California in the late 19th century, archaeologists began organizing the archaeological record into cultural stages to develop a chronological sequence, or "culture history," of California. These cultural histories were developed regionally. Generally, California has eight identified archaeological regions: the North Coast, Northeast, Central Valley, Sierra Nevada, San Francisco Bay, Central Coast, Southern Coast, and Desert Regions (Moratto 1984; Moratto and Chartkoff 2010). Within these regions, various chronologies attempt to account for changes in the archaeological record as a result of inferred changes in human behavior. The archaeological record in California, therefore, reflects some shared broad-based patterns, but it also exhibits locally expressed culture traits. The numerous indigenous groups that arrived in the region now referred to as California were linguistically diverse, and they further distinguished themselves from their neighbors by developing cultural traits unique to their communities.

California Ethnography

The indigenous peoples of California were extremely diverse and populous when Europeans first began to colonize the state. This diversity is reflected in the large number of mutually unintelligible languages that have been identified. At least 64, and possible as many as 80, languages were spoken (Shipley 1978) and, among these languages, hundreds of dialects were present. These different languages and dialects essentially translate to individual tribes or tribelets. Although many ethnographic groups shared cultural traits based on geographic location and available resources, each also had unique expressions of culture.

The territorial boundaries delineated by early ethnographers for Native California groups have varied over time and are often poorly defined. In addition, many tribal boundaries overlapped. The boundaries should not be considered fixed, but reflect general areas in which Native American groups resided. Most groups migrated within these general boundaries throughout the year.

All California Indians, at the time of colonization, subsisted by hunting and gathering. Coastal groups relied heavily on marine food resources, such as fish, shellfish, and marine mammals, as well as terrestrial resources, while interior groups relied primarily on terrestrial resources for shelter and subsistence. Agriculture, in the modern sense, was not generally practiced, although indigenous Californians managed their environment and resources through the use of fire and the grooming of plants in their natural habitats. Tribes along the Colorado River, however, were influenced by their neighbors to the east and grew cultivars such as maize and pumpkins, among other crops (Howell 2015).

The Native populations were greatly affected by colonization of Europeans and Euro-Americans. For a discussion of this period in Native Californian history, refer to Section 4.13, *Tribal Cultural Resources.*

California History

The beginning of the historic era varied by region throughout California, but generally it started between the mid-1500s and mid-1800s, moving from south to north through the state. Historic-era cultural activities provide a record of Spanish, Mexican, and American rule, occupation, and land use. A much-abbreviated history is presented to provide a background of the presence, chronological significance, and historical relationship of cultural resources within the state.

The earliest explorations of California by Europeans were by sea. Portuguese captain Juan Rodriquez Cabrillo landed in the vicinity of San Diego in 1542. He also toured the Channel Islands before heading up the coast along the length of the state. He was followed by Sir Francis Drake in 1579 and Sebastian Viscano in 1602. None of these first explorers established settlements or had extensive interactions with Native Californians.

During the Spanish Period (1769–1822), the Spanish government established a series of presidios, missions, and towns along the coast of Alta California (also called New Spain), from San Diego to San Francisco. The Spanish colonized the local Native Americans along the way. Despite scattered Spanish occupation, however, California remained largely unsettled throughout this period. The routes used to travel between the presidios and missions provided the outline for today's U.S. Interstate Highways 101 and 5 (Kyle et al. 2002).

The Mexican people took New Spain back from the Spanish in 1822 and renamed it the Republic of Mexico, thus beginning the Mexican Period (1822–1848). During this time, the Catholic missions were secularized and the Indians were left to fend for themselves. Large land grants, also known as ranchos, were given to loyal Californios (Mexican settlers of the new territory). Many outsiders who were seeking to take advantage of California's abundant resources arrived during this time. As more settlers arrived, relations between Mexico and the United States grew tense, ultimately resulting in war in 1846. California was formally annexed to the United States by the Treaty of Guadalupe Hidalgo in 1848, ending the Mexican-American War (Kyle et al. 2002).

The end of the Mexican-American War and the discovery of gold marked the beginning of the American Period (1848–present). This discovery drew people from around the world to California, which caused a substantial increase in the local nonnative population and resulted in severe impacts on California's indigenous communities, as described above. The American Civil War took place from 1861 to 1865, and although California's involvement was minimal, construction of the Transcontinental Railroad may have been the most important immediate effect of the Civil War on California. Easy access to rail lines made large-scale agricultural pursuits an important element in the state's economy (Kyle et al. 2002).

California Cultural Resources Studies

Interest in California Native American cultures has been ongoing since the first colonists arrived in the state. This is attested to by the detailed accounts of interactions with tribes by explorers and the Spanish friars who established the missions throughout the state, and continued during the Mexican era, when fur trappers and military scouts wrote of their encounters with the indigenous population. Newspapers and journals wrote about Native

American cultures in public venues during and after the massive wave of immigrants that arrived as part of the Gold Rush (Heizer 1978:1-5).[1]

Scholars and avocationalists began more systematic cultural resources studies in the late 1800s. By 1901, the Department and Museum of Anthropology was established at the University of California, Berkeley (Heizer 1978:1-5). Research in California ethnography and archaeology flourished as academic institutions throughout the state and nation, including government-backed entities such as the Smithsonian Institution, funded research.

The post–World War II years saw an unprecedented era of development throughout the United States as new highways were constructed, suburban communities exploded in size, and urban centers that were showing signs of wear were torn down as part of redevelopment projects. By the 1960s, people who cared about the preservation of cultural resources became concerned about how development was affecting the archaeological sites, and historic buildings that lent character to a city.

A preservation movement grew and, building on earlier federal laws to protect cultural resources, the NHPA was passed in 1966. A primary purpose of the NHPA was included in Section 106, which required that federal agencies take into account how projects conducted by, or with a "nexus" to, the federal government would affect cultural resources that are important to the United States. For the first time, some cultural resources studies were required by federal law, rather than being limited to academic research.

California followed suit when CEQA was passed in 1970, and the law required that projects evaluate whether significant effects would occur to "unique archaeological resources" (PRC Section 21083.2). At that time, significant built-environment resources were largely recorded as California Historical Landmarks. The establishment of the CRHR (PRC Section 5024.1) in the early 1980s broadened the opportunity to identify and protect important buildings, as well as objects, structures, sites, areas, places, records, or manuscripts.

Since the advent of the NHPA and CEQA, thousands of cultural resources studies have been conducted throughout the state in compliance with these laws and thousands of resources have been recorded through these efforts. To date, more than 350,000 cultural resources have been recorded within the state. There are also approximately 40,000 resources listed on the CRHR; about 30 percent of CRHR-eligible resources overlap with the overall counts for cultural resources in California (Allison, pers. comm., 2016). This vast number of recorded resources attests to the cultural complexity, depth, and breadth of California's history, which is reflected in every county throughout the state.

California Archaeological Resources

Prehistoric resources are the material remains of human activities that predate contact with European and Euro-American colonists. Prehistoric resources may include habitation or

[1] Archaeological materials were routinely uncovered during mining activities and were generally thought to be quite old. Widespread excitement and discussion about the remains of "Calaverous Man," which was claimed to be of Pleistocene Age, became popular in the 1860s, although it was later discovered to be a hoax (Heizer 1978:1:5).

village sites, temporary campsites, roasting pits/hearths, burials, bedrock milling features, lithic scatters, rock art, rock features (such as hunting blinds), and isolated artifacts.

Prehistoric resources have been found in many ecosystems and terrains, including river and stream drainages; coastal strips are often prime locations for Native American village sites and processing camps. Prehistoric resources are found in valleys, hills, mountains, deserts, grasslands, and forests, particularly adjacent to watercourses.

Historic-era archaeological resources are physical remains that coincide with the advent of written records. Historic-era archaeological resources may represent the remains of city or town sites, homesteads, ranches, missions, or military outposts. They may include, among other things, privy pits, dumps, mining remains, transportation facilities, water conveyance systems, resource extraction facilities (such as quarries), and isolated artifacts. Historic-era archaeological resources often occur in the same places as prehistoric sites because these were the desirable locations for human settlement that provided food, shelter, and other necessary resources.

California Built-Environment Resources

Built-environment resources refer to buildings, structures, and objects that were constructed during the historic era. A building is defined as a constructed place "created principally to shelter any form of human activity" (National Park Service [NPS] 1990). Examples of buildings include, but are not limited to, barns, churches, administrative buildings, courthouses, forts, houses, libraries, mill buildings, missions, schools, sheds, theaters, and train stations. Structures are distinguished from buildings as "functional constructions made usually for purposes other than creating human shelter" (NPS 1990). Among other things, structures include aircraft, boats, bridges, canals, dams, earthworks, fences, highways, irrigation systems, kilns, railroad grades, and tunnels. Both buildings and structures are essentially utilitarian in nature. Objects, on the other hand, are often artistic in nature; they are usually "relatively small in scale and simply constructed" (NPS 1990). Objects are represented by boundary markers, fountains, mileposts, monuments, sculptures, and statuary.

Built-environment resources are found in virtually any location where humans have traveled or settled.

4.5.4 Impact Analysis

This discussion describes the methodology and significance criteria that were used to analyze cultural resources. It then presents the analysis of the potential environmental impacts of the Proposed Program, and identifies environmental protection measures in the regulations that would reduce the potential for impacts.

Methodology

This section of the PEIR evaluates potential direct and indirect cultural resource–related impacts that could result from cannabis cultivation activities that would be licensed under the Proposed Program. Potential cultural resource impacts were compared to the thresholds of significance discussed below.

Significance Criteria

For the purposes of this analysis, based on Appendix G of the State CEQA Guidelines, the Proposed Program would result in a significant impact related to cultural resources if it would:

A. Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5;

B. Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5;

C. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature; or

D. Disturb any human remains, including those interred outside of dedicated cemeteries.

As previously discussed, paleontological resources are not found in soil but are contained within the geologic deposits or bedrock that underlies the soil layer. Therefore, cultivation activities would not encounter any paleontological resources, and Criterion C is not addressed further.

Environmental Impacts of the Proposed Program

General Cultivation Impacts

Impact CR-1: Cause substantial adverse impacts on historical resources, archaeological resources, and human remains. (Less than Significant with Mitigation)

General cultivation impacts include impacts of any type of cultivation activity: outdoor, mixed-light, indoor, nursery, and processing.

Ground disturbance and/or other site development activities for the purposes of cannabis cultivation have the potential to affect cultural resources. Site development falls outside of the scope of the Proposed Program, which is a licensing program for the cultivation activities themselves. Potential construction activities associated with site development would need to be performed in accordance with all applicable local, State, and federal regulatory systems, including but not limited to those related to cultural resources. Local agencies would have responsibility for ensuring that site development complies with applicable regulations, including CEQA, through review and issuance of local permit, license, or other authorization for cannabis cultivation site development activities. Site development activities are more fully considered in Chapter 6, *Cumulative Considerations*, of this Draft PEIR.

Cultivation activities themselves would generally have limited potential for adverse impacts on cultural resources. However, cultivation may involve excavation within soil that has not been disturbed previously. As such, while considered unlikely, excavation could encounter buried historic or archaeological resources or human remains. For some types of cultivation activities, such as those conducted indoors, those involving no ground disturbance (for instance, when using planter pots as opposed to planting in the ground), or those that

would be excavated in previously disturbed soils, the potential to encounter such resources would be negligible.

It is also considered unlikely that cultivation itself would result in modification or demolition of historic structures that could affect the characteristics that make the building eligible for listing in the CRHR; such impacts would be more likely to occur as part of site development and, as a result, would be evaluated by the local agency during its approval process for site development. In addition, the Proposed Program's environmental protection measures related to cultural resources, specifically the accidental discovery of human remains (Section 8313[c] of the proposed regulations), would require applicants to halt cultivation activities and implement Health and Safety Code Section 7050.5 if human remains were discovered.

However, for individual licenses, as part of the application process, CDFA would consider site-specific information to evaluate whether significant impacts could occur at a particular location. The extent that significant impacts are possible, that have not been considered in this PEIR, a site-specific CEQA document would be required as part of the approval process undertaken by CDFA, a local agency, and/or other responsible agencies. During preparation of these CEQA documents, the lead agency would conduct studies to identify significant cultural resources or human remains in or adjacent to the licensed premises that could be adversely affected by cultivation activities. The lead agency may need to develop mitigation measures, according to PRC Section 15126.4(b), if any such resources are identified, as well as include measures to address unanticipated discoveries. Therefore, issues regarding impacts on cultural resources would be addressed/resolved on a site-specific level, often well before the time the applicant applies for a license from CDFA under the Proposed Program.

Finally, a mitigation measure has been added that would ensure that any unexpected discoveries of cultural resources during cultivation do not result in significant impacts. Implementation of **Mitigation Measures CR-1 (Suspend Cultivation Immediately if Cultural Resources Are Discovered, Evaluate All Identified Cultural Resources for CRHR Eligibility, and Implement Appropriate Mitigation Measures for Eligible Resources)** would ensure that applicants comply with State laws relating to protection of cultural resources. Therefore, this impact would be **less than significant with mitigation**.

Mitigation Measure CR-1: Suspend Cultivation Immediately if Cultural Resources Are Discovered, Evaluate All Identified Cultural Resources for CRHR Eligibility, and Implement Appropriate Mitigation Measures for Eligible Resources.

Not all cultural resources are visible on the ground surface. As a result, before initiation of ground-disturbing activities, the licensee shall arrange for cultivation employees to receive training about the kinds of archaeological materials that could be present at the cultivation site and the protocols to be followed should any such materials be uncovered during cultivation. Training shall be conducted by an archaeologist who meets the U.S. Secretary of the Interior's professional standards. Training shall be required during each phase of cultivation to educate new cultivation personnel.

If any cultural resources, including structural features, unusual amounts of bone or shell, flaked or ground stone artifacts, historic-era artifacts, human remains, or architectural remains, are encountered during cultivation activities, work shall be suspended immediately at the location of the find and within a radius of at least 50 feet and the appropriate jurisdiction will be contacted.

All cultural resources uncovered during cultivation within the site shall be evaluated for eligibility for inclusion in CRHR. Resource evaluations shall be conducted by individuals who meet the U.S. Secretary of the Interior's professional standards in archaeology, history, or architectural history, as appropriate. If any of the resources meet the eligibility criteria identified in PRC Section 5024.1 or State CEQA Guidelines Section 21083.2(g), mitigation measures will be developed and implemented in accordance with State CEQA Guidelines Section 15126.4(b) before cultivation resumes.

For any resources eligible for listing in the CRHR that would be significantly adversely affected by cultivation, additional mitigation measures shall be implemented. Mitigation measures for archaeological resources may include (but are not limited to) avoidance; incorporation of sites within parks, greenspace, or other open space; capping the site; deeding the site into a permanent conservation easement; or data recovery excavation. Mitigation measures for archaeological resources shall be developed in consultation with responsible agencies and, as appropriate, interested parties such as Native American tribes. Implementation of the approved mitigation is required before resuming any cultivation activities with the potential to affect identified eligible resources at the site.

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4.6 Energy Use and Greenhouse Gas Emissions

4.6.1 Introduction

This section presents the environmental setting and potential impacts of the Proposed Program related to energy use and greenhouse gas (GHG) emissions. Information regarding energy use and GHG emissions presented in this section is based on numerous sources, including:

- Local, state, federal, and international governmental reports;
- Published scientific studies and peer-reviewed academic journal articles; and
- Nongovernmental organization reports.

4.6.2 Regulatory Setting

Federal Laws, Ordinances, Regulations, and Standards

At the federal level, the U.S. Environmental Protection Agency (USEPA) has developed regulations to reduce GHG emissions from motor vehicles and has developed permitting and reporting requirements for large stationary emitters of GHGs. The Proposed Program regulations would not require separate GHG emission permitting or reporting because agriculture is not one of the industrial sectors regulated due to the relatively small scale of total emissions. The following sections briefly describe the history and content of the regulatory programs developed to date by USEPA and the U.S. Supreme Court.

The U.S. Supreme Court (Court) ruled for the first time in 2007 that GHG emissions are air pollutants covered under the federal Clean Air Act, in its decision *Massachusetts v. Environmental Protection Agency* (549 U.S. 497). The Court found that USEPA has a mandatory duty to enact rules regulating mobile GHG emissions under the Clean Air Act. The Court held that GHGs fit the definition of an air pollutant causing and contributing to air pollution, which reasonably may be anticipated to endanger public health or welfare. In 2009, the USEPA Administrator determined that existing and projected concentrations of GHGs threaten public health and welfare of present-day and future generations, and that combined emissions from motor vehicles contribute to GHG pollution. USEPA's endangerment finding covers emissions of six key GHGs: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). These GHGs are discussed further in Section 4.6.3, "Environmental Setting."

Corporate Average Fuel Economy and GHG Emission Standards

In 2009, the National Highway Traffic Safety Administration (NHTSA) and USEPA issued the first joint ruling to establish a national program to regulate passenger cars and light trucks of model years 2012-2016 to improve fuel economy and reduce GHG emissions. NHTSA previously had set Corporate Average Fuel Economy (CAFE) standards for vehicle fuel efficiency, but the joint rule was the first coordinated effort between federal programs for fuel economy and GHGs. Since then, NHTSA and USEPA have issued new fuel efficiency and

GHG emission standards. On April 1, 2010, USEPA and NHTSA established a program to reduce GHG emissions and improve fuel economy standards for new model year 2012-2016 cars and light trucks. On August 28, 2012, USEPA and NHTSA enacted further reductions and issued a joint final rulemaking to establish 2017-2025 GHG emissions and CAFE standards for motor vehicles.

To address larger motor vehicles not covered in the regulations for cars and light trucks, on September 15, 2011, USEPA and NHTSA issued a final rule for Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles (76 Federal Register [FR] 57106). This final rule is tailored to each of three regulatory categories of heavy-duty vehicles (combination tractors, heavy-duty pickup trucks and vans, and vocational vehicles) as well as medium-duty vehicles. On October 15, 2012, USEPA and NHTSA established a program to reduce GHG emissions and improve fuel economy standards for new cars and light trucks through 2025 (USEPA 2012). In March 2017, USEPA announced that the CAFE standards would be revisited as part of a mid-term evaluation to determine whether the 2022-2025 standards are appropriate (USEPA 2017). A decision would be required by April 2018 (USEPA 2017).

Mandatory Reporting of Greenhouse Gases Rule

In response to the 2008 Consolidated Appropriations Act, USEPA issued the Mandatory Reporting of Greenhouse Gases Rule in 2009. The purpose of this rule is to collect accurate GHG data to inform future policy decisions. The rule requires reporting of GHG data and other relevant information from large sources and suppliers in the United States. Large sources are considered to have facilities that emit more than 25,000 metric tons of carbon dioxide equivalent (CO_2e) emissions per year. Facilities began reporting yearly emissions for 2010, and these data became available to the public in January 2012.

Clean Power Plan

In 2015, President Barack Obama and USEPA announced the Clean Power Plan, which is aimed at reducing carbon pollution from existing fossil fuel–fired electric generating units. The plan was designed to be flexible while implementing strict regulations to encourage the development of cleaner and lower-polluting American energy. On February 9, 2016, the Court stayed implementation of the Clean Power Plan pending judicial review. While awaiting action by the Court, USEPA is continuing work with states that choose to find ways to reduce GHG emissions from power plants. In March 2017, President Donald Trump issued an Executive Order titled "Promoting Energy Independence and Economic Growth," which orders USEPA to review the final rule and potentially suspend, revise, or rescind it. Thus, it is not known at this time whether this program will be implemented.

State Agencies, Laws, and Programs

At the state level, the California Air Resource Board (CARB) has developed regulations to reduce GHG emissions from motor vehicles and has developed permitting and reporting requirements for large stationary emitters of GHGs such as fossil-fueled power plants. As with federal requirements, the Proposed Program regulations would not require separate GHG emission permitting or reporting at the state level, because agriculture is not one of the industrial sectors regulated due to the relatively small scale of total emissions compared to other large emission sources.

Assembly Bill 1493

With the passage of Assembly Bill (AB) 1493 in 2002, California launched a proactive approach for dealing with GHG emissions and climate change at the state level. AB 1493 required CARB to develop and implement regulations to reduce automobile and light truck GHG emissions. These stricter emissions standards apply to automobiles and light trucks beginning with the 2009 model year. Although litigation was filed challenging these regulations and USEPA initially denied California's related request for a waiver, a waiver subsequently was granted (CARB 2014).

Executive Orders S-03-05, B-16-2012, and B-30-15

In 2005, Governor Arnold Schwarzenegger issued Executive Order S-03-05, calling for statewide GHG reductions to 2000 levels by 2010, to 1990 levels by 2020, and to 80 percent below 1990 levels by 2050. The executive order also called for the creation of a "Climate Action Team," which was to report to the Governor every 2 years on progress toward meeting the targets and the effects of GHG emissions on the state. The latest of these reports, *Climate Action Team Report to Governor Schwarzenegger and the California Legislature*, was published in December 2010 (California Environmental Protection Agency [Cal/EPA] 2010). In March 2012, Governor Jerry Brown issued Executive Order B-16-2012, affirming the long-range climate goal for California to reduce GHG emissions to 80 percent below 1990 levels by 2050. In 2015, Governor Brown issued Executive Order B-30-15, which established a California GHG reduction target of 40 percent below 1990 levels by 2030.

California Global Warming Solutions Act

CARB is the lead agency for implementing AB 32, the California Global Warming Solutions Act, adopted by the California State Legislature in 2006. AB 32 set a statewide target to reduce GHG emissions to 1990 levels by 2020. AB 32 also required CARB to prepare a Scoping Plan identifying the main strategies to be used to achieve reductions in GHG emissions in California.

After receiving public input on its discussion draft of the Proposed Scoping Plan (released in June 2008), CARB issued its Climate Change Proposed Scoping Plan in October 2008, and adopted the plan in December 2008 (CARB 2008). This plan contains an outline of the proposed State strategies to achieve the 2020 GHG emission limits. Key elements of the Scoping Plan include the following recommendations:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards;
- Achieving a statewide renewable energy mix of 33 percent;
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system;
- Establishing targets for transportation-related GHG emissions for regions throughout California and pursuing policies and incentives to achieve those targets;

- Adopting and implementing measures in accordance with existing State laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard (described below); and
- Creating targeted fees, including a public goods charge on water use, fees on gas emissions with high global warming potential, and a fee to fund the administrative costs of the State's long-term commitment to AB 32 implementation.

Under the Scoping Plan, approximately 85 percent of the state's emissions are subject to a cap-and-trade program, where covered sectors are placed under a declining emissions cap. Emissions reductions are to be achieved through regulatory requirements and the option to reduce emissions further or purchase allowances to cover compliance obligations. Emission reductions from this cap-and trade program are expected to account for a large portion of the reductions required by AB 32.

CARB is updating the Scoping Plan to reflect progress since 2005, additional reduction measures, and plans for reductions beyond 2020. CARB recently released the draft proposed second update to reflect the 2030 target set by Executive Order B-30-15 and codified by SB 32 (CARB 2017).

Senate Bill 32 and Assembly Bill 197

Senate Bill (SB) 32, a follow-up to the California Global Warming Solutions Act of 2006 (AB 32), calls for a statewide GHG emissions reduction to 40 percent below 1990 levels by December 31, 2030, by promoting technology and cost-effective GHG emission reductions. SB 32 particularly targets reductions in the state's most disadvantaged communities, which would be disproportionality affected by climate change.

AB 197 expands the legislative oversight of CARB and its associated climate change activates. The bill includes updates to the number and responsibilities of the CARB board membership, CARB regulations and rulemaking, and the schedule by which information is updated and disclosed. AB 197 and SB 32 were approved by Governor Brown in September 2016.

Low Carbon Fuel Standard

Executive Order S-1-07, the Low Carbon Fuel Standard (LCFS), was issued in January 2007. The order called for a reduction of at least 10 percent in the carbon intensity of California's transportation fuels by 2020. The LCFS was approved by CARB in 2009, and was implemented in January 1, 2011 with subsequent amendments going into effect December 2011. The regulation established annual performance standards for fuel producers and importers, applicable to all fuels used for transportation in California (CARB 2011). In September 2015, the Board approved the readoption of the LCFS, which became effective on January 1, 2016, to address procedural deficiencies in the way the original regulation was adopted.

Senate Bill 375

SB 375, the Sustainable Communities and Climate Protection Act of 2008, enhanced California's ability to reach its AB 32 goals by promoting land use and transportation planning with the goal of more sustainable communities. SB 375 requires CARB to develop regional GHG emission reduction targets for 2020 and 2035 for each region covered by one of the state's 18 metropolitan planning organizations (MPOs). Executive Order G-11-024 set these targets in 2011. The MPOs were tasked with developing Sustainable Communities Strategies (SCS) that integrate land use and transportation planning and demonstrate an ability to attain the 2020 and 2035 reduction targets.

CDFA's GHG Reduction Actions

The California Environmental Protection Agency (Cal/EPA) is required to prepare an annual report describing State agency actions to reduce GHG emissions. The 2013 *State Agency Greenhouse Gas Reduction Report Card* (Cal/EPA 2013) lists GHG reduction programs and actions being undertaken by State agencies, including CDFA. These include research and education programs to study GHG emissions from nitrogen fertilizers, implementation of dairy biodigester systems, and biofuel production from crops.

CDFA's 2010 report entitled *California Agricultural Vision* (Ag Vision) addresses future sustainability challenges faced by the California agriculture system and contains strategies and actions to adapt to climate change and reduce GHG emissions (CDFA 2010). Strategies include promoting the use of renewable energy and substitutes for fossil-based inputs and identifying ways to reduce GHG emissions from diesel fuel, nitrogen fertilizer, pesticides, and other agricultural chemicals. In 2012, CDFA issued a progress report documenting ongoing progress in meeting the Ag Vision strategies and action items (CDFA 2012).

CEQA Guidance and GHG Significance Thresholds

Several air districts have drafted or adopted guidance on the analysis of GHGs under the California Environmental Quality Act (CEQA). These guidance documents contain recommended methods for quantifying GHGs and determining the significance of GHG emission impacts. Additionally, the California Governor's Office of Planning and Research added a Greenhouse Gas Emissions section to the State CEQA Guidelines Appendix G Environmental Checklist to assist lead agencies with review and quantification of potential climate change impacts. Typically, GHG emission significance thresholds are based on a "bright-line" level of GHG emissions, which sets a numerical mass emission limit for the incremental increase from baseline to future; best performance standards; a reduction target from baseline GHG emission levels; or consistency with a climate action plan (CAP). Section 15064.4 of the State CEQA Guidelines provides the following direction on determining the significance of impacts from GHG emissions:

> (a) The determination of the significance of greenhouse gas emissions calls for a careful judgment by the lead agency consistent with the provisions in section 15064. A lead agency should make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate the amount of greenhouse gas emissions resulting from a project. A lead agency shall have discretion to determine, in the context of a particular project, whether to:

> (1) Use a model or methodology to quantify greenhouse gas emissions resulting from a project, and which model or methodology to use. The lead agency has discretion to select the model or methodology it considers most appropriate provided it supports its decision with substantial evidence. The lead agency should explain the limitations of the particular model or methodology selected for use; and/or
>
> (2) Rely on a qualitative analysis or performance based standards.
>
> (b) A lead agency should consider the following factors, among others, when assessing the significance of impacts from greenhouse gas emissions on the environment:
>
> (1) The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting;
>
> (2) Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.
>
> (3) The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions. Such requirements must be adopted by the relevant public agency through a public review process and must reduce or mitigate the project's incremental contribution of greenhouse gas emissions. If there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding compliance with the adopted regulations or requirements, an EIR must be prepared for the project.

The "Methodology" discussion in Section 4.6.4, "Impact Analysis," identifies the thresholds applicable to this analysis.

Local Laws, Plans, Policies, and Regulations

Sustainable Communities Strategy

As mentioned above and described in Section 4.3, *Air Quality*, MPOs throughout the state were tasked with developing a sustainable communities strategy (SCS) to integrate land use and transportation planning in their respective planning regions. An SCS may contain provisions for projects that are consistent with the SCS to be relieved of certain environmental review requirements, although these streamlining processes mainly apply to development involving residential and mixed-use projects.

Local General Plans and Climate Action Plans

Many city and county general plans contain goals, policies, and strategies related to air quality and GHG emissions. In addition, some cities and counties have adopted or drafted CAPs or GHG emission reduction plans. Demonstration of project compliance and consistency with the CAP may involve evaluation of GHG emissions with a bright-line threshold, implementation of mandatory or voluntary GHG reduction measures, or a comparison of project emission reductions and CAP emission reduction goals.

For example, the Tulare County CAP requires that projects achieve a 6-percent reduction in GHG emissions to be consistent with the CAP (Tulare County 2010). The City of Sacramento CAP lists primary actions for GHG emissions reductions that must be incorporated into new development projects and existing development for CAP compliance (City of Sacramento 2012). The San Diego County CAP contains an efficiency threshold (emissions per service population), a bright-line threshold, and a performance threshold for development projects, as well as a stationary-source threshold (County of San Diego 2012).

General plans and CAPs may include applicable policies and strategies such as encouraging the use of low-carbon fuels and alternative energy, limiting idling time of vehicles and equipment, recommending best management practices for agricultural operations and construction, and supporting heavy-duty fleet conversions.

Local Ordinances Related to Commercial Cannabis Cultivation

As of December 2016, several counties and cities in the state have established cannabis cultivation ordinances that include regulations related to energy use and GHG emissions (**Table 4.6-1)**. As indicated in Table 4.6-1 and described below, Humboldt, Mendocino, and Monterey County regulations specify limitations on the source of energy that can be used, such as renewable sources or offset requirements, and some prohibit the use of on-site diesel generators.

Humboldt County implemented Ordinance No. 2544 in early 2016; the ordinance mandates the use of renewable energy for medical cannabis cultivation. The ordinance states that electrical power for indoor cultivation operations, including (but not limited to) illumination, heating, cooling, and ventilation, shall be provided by on-grid power with 100-percent renewable sources, on-site zero-net-energy renewable sources, or the purchase of carbon offsets of any portion of power not from renewable sources. According to Monterey County Ordinance No. 5270, on-site renewable energy generation shall be required for all indoor operations (cultivation activities using high-intensity artificial lighting). The required use of renewables in these two regulations offsets the increase in energy demand from standard public energy sources such as fossil fuel plants, and subsequently reduces potential impacts related to GHG emissions and climate change. For similar reasons, Mendocino County placed restrictions on the use of diesel generators for cultivation in Ordinance No. 4356; this restriction has the added benefit of fire protection as well as reducing potential emissions.

Table 4.6-1. Local Regulations Addressing Energy Use for Commercial Cannabis Cultivation

County	Ordinance	Summary of Policies
Renewable Energy Requirements		
Humboldt	Ordinance No 2544	Electrical power for indoor cultivation shall be provided by on-grid power with 100 percent renewable source, on-site net-zero-energy renewable source, or the purchase of carbon offsets of any portion of power not from renewable sources.
Mendocino	Ordinance No. 4356	Indoor cultivation may not rely on diesel generators for a source of power.
Monterey	Ordinance No. 5270	On-site renewable energy generation shall be required for all indoor cultivation activities. Renewable energy systems shall be designed to have a generation potential equal to or greater than one half of the anticipated energy demand.
Energy Use Requirements		
Mendocino	Ordinance No. 4356	Light assistance for outdoor cultivation must not exceed 600 watts per 100 square feet of growing area.
Sacramento	Ordinance No. 2016-0006	Indoor grow lighting systems shall not exceed 3,800 watts; also limits square footage to 400 square feet.
Yolo	Ordinance No. 1542	Use of light assistance for outdoor cultivation shall not exceed 600 watts per 100 square feet of growing area.

In addition, Mendocino, Sacramento, and Yolo Counties have existing medical cannabis cultivation energy use requirements (Table 4.6-1**)**. Current regulations are primarily based on limiting the allowed wattage for a cultivation site, either by total wattage allowed for the entire operation or by square footage. It is important to note that each of these counties requires a special use permit to allow for new development or operation of a cultivation site. A special use permit allows local review of a proposed project and the ability to place additional mitigation measures and restrictions on the project.

Sacramento County Ordinance No. 2012-045, issued in November 2012, sets the maximum allowable wattage for a cultivation site at 3,800 watts; the same ordinance limits the square footage to 400 square feet.

Mendocino County in Ordinance No. 4356 and Yolo County in Ordinance No. 1542 both set limitations at 600 watts for every 100 square feet of cultivation area. These two counties have not placed the same restriction on area as Sacramento County, instead choosing to adopt the CalCannabis Cultivation Licensing program's allowances for the various license types.

4.6.3 Environmental Setting

Greenhouse Gas Emissions

This section describes global climate change; GHG and related emissions; and global, national, and California GHG emission inventories.

Global Climate Change

"Global warming" and "global climate change" are terms that describe changes in the Earth's climate. Global climate change is a broader term, used to describe any worldwide, long-term change in the Earth's climate. This change could be, for example, an increase or decrease in temperatures, the start or end of an ice age, or a shift in precipitation patterns. The term global warming is more specific and refers to a general increase in temperatures across the Earth. Although global warming is characterized by rising temperatures, it can cause other climatic changes, such as a shift in the frequency and intensity of rainfall or hurricanes. Global warming does not necessarily imply that all locations will be warmer. Some specific locations may be cooler even though the Earth, on average, is warming. All of these changes fit under the umbrella of global climate change.

Because GHGs persist and mix in the atmosphere, they have impacts on a global scale, rather than locally or regionally as with most air pollutants. Consequently, GHG emissions that contribute to global climate change result in a worldwide cumulative impact (global warming) rather than a local or regional project-specific impact like those typically associated with criteria pollutants.

Although natural processes have, in the past, caused global warming, general scientific consensus concurs that present-day global warming is primarily the result of human activity on the planet (IPCC 2008, 2013). According to the Intergovernmental Panel on Climate Change's (IPCC's) *Fourth Assessment Report: Climate Change 2007,* scientific consensus concurs that the global increases in atmospheric concentrations of GHGs since 1750 have resulted mainly from human activities such as fossil fuel use, land use change (e.g., deforestation), and agriculture (IPCC 2008, 2013). This human-made, or anthropogenic, warming primarily is caused by increased GHG emissions that keep the Earth's surface warm, known as the "greenhouse effect." The greenhouse effect and the role GHG emissions play in it are described below.

Greenhouse Gases and Related Emissions

The term "greenhouse gases" refers to the group of gases that contribute to the natural greenhouse effect[1] as well as gases that are human-generated and are emitted by modern industrial products, such as HFCs, chlorinated fluorocarbons, and SF_6. These last two families of gases, although not naturally present, have properties that also cause them to

[1] The greenhouse effect occurs when gases comprising Earth's atmosphere trap some of the heat from solar radiation, and radiate that heat back to Earth's surface. The effect's name is derived from the similar warming effect experienced by glass-walled greenhouses (SFGate 2017).

trap infrared radiation when they are present in the atmosphere, thus making them GHGs. Each of these gases affects global warming through a combination of the volume of their emissions and their global warming potential (GWP). GWP indicates, on a pound-for-pound basis, how much a gas will contribute to global warming (i.e., its potential to trap heat) relative to how much warming would be caused by the same mass of CO_2. The most important GHG in human-induced global warming is CO_2. Although many gases have much higher GWPs than the naturally occurring GHGs, CO_2 is emitted in such vastly higher quantities that it accounts for 85 percent of the GWP of all GHGs emitted in the United States (USEPA 2006). Fossil fuel combustion, especially for the generation of electricity and powering of motor vehicles, has led to substantial increases in CO_2 emissions over time and, thus, substantial increases in atmospheric CO_2 concentrations. In 2005, atmospheric CO_2 concentrations were about 379 parts per million (ppm), more than 35 percent higher than the preindustrial concentrations of about 280 ppm (IPCC 2008). In addition to the sheer increase in the volume of its emissions, CO_2 is a major factor in human-induced global warming because of its long lifespan in the atmosphere (50 to more than 200 years).

Global, National, and California GHG Emission Inventories

GHG emissions typically are measured in terms of mass of CO_2e. CO_2e is calculated as the product of the mass of a given GHG and its specific GWP. Worldwide emissions of GHGs in 2004 were more than 20 billion metric tons (1 metric ton being equivalent to 1,000 kilograms) of CO_2e per year (United Nations Framework Convention on Climate Change 2014). In 2013, U.S. sources emitted about 6.7 billion metric tons of CO_2e, an increase of about 8.4 percent since 1990, but a reduction of about 6.9 percent from 2005 inventories (USEPA 2013). Approximately 80 percent of the GHG emissions in the U.S. are comprised of CO_2 emissions from fossil fuel combustion (USEPA 2013). Figure 4.6-1 and Figure 4.6-2 provide an overview of relative GHG emissions in the United States by type of GHG and source, respectively.

Table 4.6-2 shows the six GHGs and their respective GWPs.

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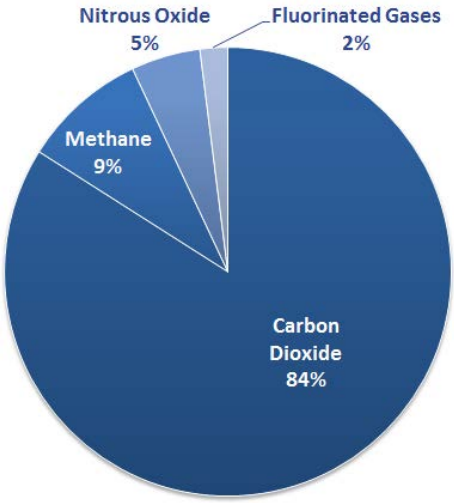
Table 4.6-2. Greenhouse Gas Overview and Global Warming Potential

Greenhouse Gas	100-year GWP (IPCC 2013/SAR)[a]	Brief Description
Carbon Dioxide (CO_2)	1/1	Released into the atmosphere through burning fossil fuels (coal, natural gas, and oil), solid waste, trees and wood products, and agricultural crop wastes or residues, and also because of certain chemical reactions; removed from the atmosphere when absorbed by plants (including agricultural activity) and the oceans; remains in the atmosphere for 50 to more than 200 years.
Methane (CH_4)	28/21	Emitted during the production and transport of coal, natural gas, and oil; also result from livestock and other agricultural practices and created by the decay of organic waste in municipal solid waste landfills; remains in the atmosphere for about 10 years.
Nitrous Oxide (N_2O)	265/310	Emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste; remains in the atmosphere for about 100 years.
Hydrofluoro-carbons (HFCs)	4-12,400/650–11,700	Typically used in refrigeration and air conditioning equipment, as well as in solvents, and primarily generated from use in air conditioning systems in buildings and vehicles; remain in the atmosphere from 10 to 270 years.
Perfluoro-carbons (PFCs)	6,630-11,100/6,500–9,200	Emitted as by-products of industrial and manufacturing sources; remain in the atmosphere from 800 to 50,000 years.
Sulfur Hexa-fluoride (SF_6)	23,500/23,900	Used in electrical transmission and distribution; remain in the atmosphere approximately 3,200 years.

Note:

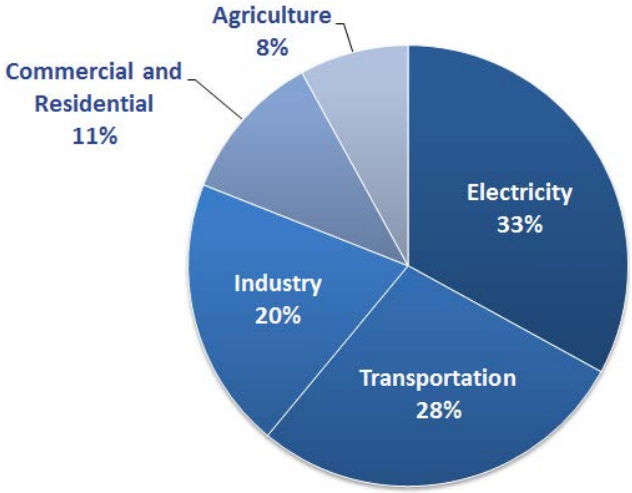
[a] As scientific understanding of the global warming potential (GWP) of GHGs improves over time, GWP values are updated in the Intergovernmental Panel on Climate Change (IPCC) scientific assessment reports. However, for regulatory consistency, the Kyoto Protocol fixed the use of GWP values to those published in the IPCC 1996 Second Assessment Report (SAR). The table shows GWP values for 100 years from both the most recent IPCC report (IPCC 2013) and SAR.

Sources: USEPA 2013, IPCC 1996, 2008, 2013



Source: USEPA 2013

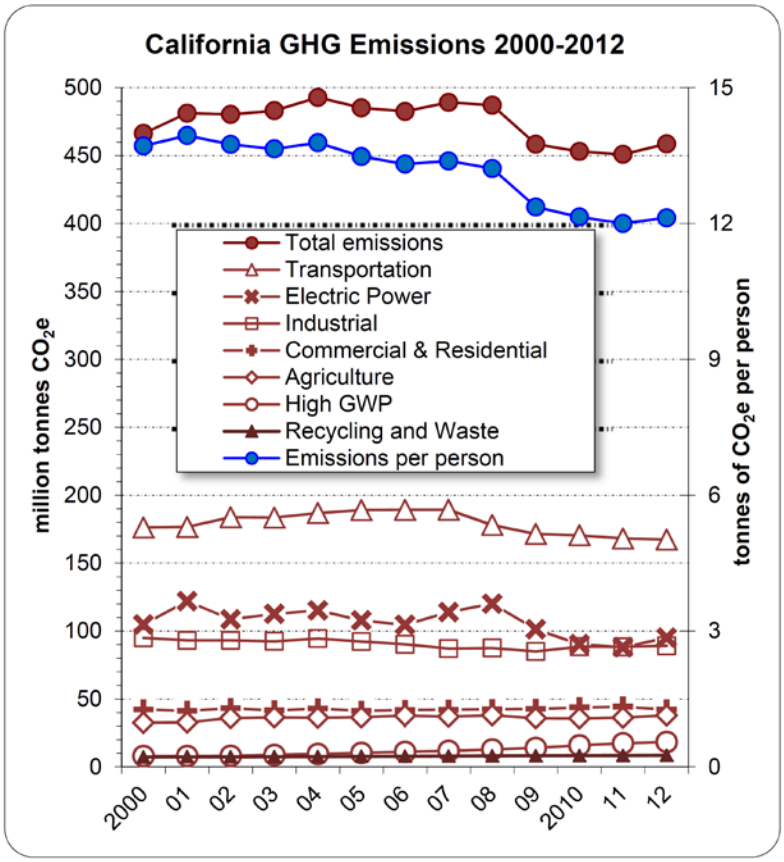
Figure 4.6-1. Greenhouse Gas Emissions by Type in U.S. (2011)



Source: USEPA 2013

Figure 4.6-2. Greenhouse Gas Emissions by Source in U.S. (2011)

In 2011, California emitted approximately 448 million metric tons of CO_2e, or about 6.7 percent of U.S. emissions; this is a reduction of about 8.4 percent since 2005, although the population grew during that period by about 5 percent. This is a large amount of emissions, primarily because of the sheer size of California; compared to other states, California has a per capita GHG emission rate of 3.1 metric tons per person, which is the seventh lowest of the 50 states. This low rate reflects California's higher energy efficiency standards, its temperate climate, and its reliance on substantial out-of-state energy generation. **Figure 4.6-3** shows GHG emissions in California by sector and per capita emissions.



Note: Tonne = metric ton (1,000 kilograms)

Source: CARB 2014

Figure 4.6-3. Greenhouse Gas Emissions in California by Sector and Per Capita (2000-2012)

Energy Use

This section describes energy use related to the commercial cultivation of cannabis. Cultivation is divided into three main groups: indoor, mixed-light, and outdoor grow operations. This information is presented to provide the framework for understanding the impacts of the Proposed Program related to energy use.

Energy Sources and Use in Cannabis Cultivation

Cannabis cultivation equipment, particularly the lighting and climate control equipment required for indoor and mixed-light cannabis cultivation operations, requires a relatively large amount of energy (primarily electricity) for operation. As described by Mills (2012), specific energy uses in indoor grow operations include high-intensity lighting, dehumidification to remove water vapor and avoid mold formation, space heating or cooling during non-illuminated periods and drying processes, preheating of irrigation water, generation of CO_2 from fossil fuel combustion, and ventilation and air conditioning to remove waste heat. Reliance on equipment can vary widely as a result of factors such as plant spacing, layout, and the surrounding climate of a given facility. Substantial energy inefficiencies also arise from air cleaning, noise and odor suppression, and inefficient

electric generators sometimes used to avoid conspicuous utility bills (Mills 2012). As a result of these appliances and systems, Mills (2012) estimates that cannabis production requires eight times as much energy per square foot as a typical U.S. commercial building, four times that of a hospital, and 18 times that of an average U.S. home.

Energy use has been estimated to comprise approximately from 9 percent (ERA Economics 2017) to one-third of the total production cost for a typical indoor growing operation; this is a major difference compared to outdoor grows, or mixed-light grows using low-intensity lighting, which require little to no energy (BOTEC Analysis Corporation 2013). According to estimates by the Northwest Power and Conservation Council, 1 kilogram (kg) of marijuana produced indoors requires 4,000-6,000 kilowatt-hours (kWh); for comparison, 16 kWh of energy is required to produce 1 kg of aluminum, which is typically considered to be an energy-intensive product (Reitz 2015). Another study estimated that approximately 2,000 kWh of energy is required to produce 1 pound of product (Arnold 2013). When considering the high unit value of cannabis (approximately $2,000 per pound wholesale), however, energy represents a smaller fraction of the cost. For example, based on aluminum's unit value of $0.90 per pound, 8,000 kWh of energy is required to make $1,000 worth of aluminum compared to 1,000 kWh to make $1,000 worth of cannabis (BOTEC Analysis Corporation 2013). An indoor grow can operate at an energy density of 2,000 watts per square meter for 8-18 hours a day depending on the life stage of the cannabis plant (Crandall 2016).

Typically, a connection to a local electricity provider's electrical system/network is used as a primary energy source for equipment. For example, in Humboldt County, Pacific Gas and Electric Company is the main electricity supplier (Arnold 2013). Additional energy sources for indoor, mixed-light, and outdoor cultivation equipment could include, but are not limited to, on-site solar panels and diesel or gasoline generators.

Mixed-light and outdoor cannabis cultivation practices typically involve a lower energy demand. In 2014, the Northwest Power and Conservation Council estimated that approximately 90 percent of the cannabis cultivated in California was grown outdoors (Northwest Power and Conservation Council 2014). Mixed-light operations, commonly referred to as greenhouses, offer a middle ground between a controlled growing environment and reduced energy demand. Mixed-light grows have substantially lower energy demand than indoor grows, where energy can account for 50 percent of operating cost (San Diego Gas & Electric [SDG&E] 2016).

4.6.4 Impact Analysis

Methodology

Due to the proprietary and often illicit nature of past and current cannabis cultivation activities, limited accurate and reliable data are available on which to base a quantitative estimate of the number of cultivation sites; their sizes; their specific cultivation activities, associated energy use, and GHG emissions; and how these activities would change from existing levels, if at all, under the Proposed Program. The SRIA (ERA Economics 2017) anticipates that the overall level of cannabis cultivation under the Proposed Program would remain generally unchanged, although there would be a slight increase in indoor cultivation and corresponding decrease in outdoor and mixed-light cultivation. However, sufficient detail is not available to determine whether this could result in a meaningful change in

energy use and GHG emissions compared to baseline conditions. For instance, the difference between the energy use associated with the outdoor and mixed-light cultivation that would cease, and the energy use of new indoor cultivation, cannot be precisely determined. Likewise, it cannot be determined whether this would result in an overall increase in energy use and GHG emissions, given similar uncertainty about cultivation methods in general (e.g., a widespread shift toward more energy-efficient technology is possible if cost effective for cultivators).

For the same reason, it is not possible to provide a quantitative estimate and analysis of current and future GHG emissions associated with employee-related commuting transportation to cultivation sites. Thus, this section provides a qualitative analysis of the Proposed Program's impacts with regard to energy use, GHG emissions, and climate change.

Significance Criteria

For the purposes of this analysis, based on Appendix G of the State CEQA Guidelines, the Proposed Program would result in a significant impact related to energy use and GHG emissions if it would:

A. Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment;

B. Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases;

C. Cause wasteful, inefficient, and unnecessary consumption of energy during construction, operation, and/or maintenance; or

D. Cause a substantial increase in energy demand and the need for additional energy resources.

The primary goals for statewide GHG reductions are to reduce GHG emissions initially to 1990 levels by 2020, and eventually to 80 percent below 1990 levels by 2050, to stabilize GHG levels in the atmosphere. These goals are tied fundamentally to AB 32 and Executive Orders S-03-05 and B-16-2012. The necessary steps to achieve these goals have been interpreted in various ways. The California Air Pollution Control Officers Association (CAPCOA) described many options in its 2008 report *CEQA and Climate Change* (CAPCOA 2008). It is widely recognized that no single project could generate enough GHG emissions to change the global climate noticeably; however, the combination of worldwide GHG emissions from past, present, and future projects could contribute substantially to global climate change. Thus, project-specific GHG emissions need to be evaluated in terms of whether or not they would result in a considerable contribution to cumulatively significant impacts related to global climate change.

The significance determination of GHG emissions can be approached in many different ways, as represented in various air districts' CEQA guidelines (some of which are in draft form and/or have been legally challenged). At this time, three major approaches are used: (1) a bright-line threshold, which sets a numerical mass emission limit for the incremental increase from baseline to future emissions; (2) a performance standard; or (3) a percentage reduction from Business as Usual (BAU). In addition, some air districts have determined

that, for most projects, no simple metric is available to determine whether a single project would substantially increase or decrease overall GHG emission levels.

Environmental Impacts of the Proposed Program

General Cultivation Impacts

Impact GHG-1: Potential to conflict with an applicable plan, policy, or regulation adopted to reduce the emissions of GHGs, result in wasteful, inefficient, and unnecessary consumption of energy, or cause a substantial increase in energy demand and the need for additional energy resources. (Beneficial)

General cultivation impacts include impacts of any type of cultivation activity: outdoor, mixed-light, indoor, nursery, and processing.

Cannabis cultivation under the Proposed Program would generate energy demand and GHG emissions from use of high-intensity lighting, ventilation, and temperature control necessary to grow cannabis indoors and in mixed-light operations. The high energy demand of indoor cultivation represents the largest contributor of GHG emissions associated with the Proposed Program. Nurseries, outdoor, and mixed-light grow operations could also utilize fuel-powered equipment that would contribute to GHG emissions. Additional sources of GHG emissions from all license types would include employee vehicle use and truck trips associated with the commuting of workers to and from cultivation sites.

According to the *Standardized Regulatory Impact Analysis* (SRIA) prepared for the MCCP (ERA Economics 2017) the estimate for cannabis production in 2016 totaled approximately 13.5 million pounds, 11 million of which was exported from the state illegally, 650,000 of which was permitted and sold medically in the state, and the remainder unpermitted and sold within the State. The SRIA report concludes that production would remain essentially unchanged with implementation of the Proposed Program, in regard to the total amount of cannabis cultivated in the state, although there would be an increase in licensed cultivation of approximately 600,000 pounds, with a corresponding decrease in unpermitted/illegal cultivation for in-state consumption. The SRIA also predicts a small increase in indoor cultivation, which is more energy-intensive than outdoor and mixed-light cultivation, which would correspondingly decrease.

The Proposed Program would implement environmental protection measures found in Sections 8313 and 8315 of the proposed regulations. Section 8313 would prohibit the use of gas- or diesel-powered generators except as a backup energy source in the event of a power outage or emergency; this is expected to reduce baseline emissions from cultivators who are relying upon generators as a primary power source.

Section 8315 would reduce the current levels of GHG emissions produced in the state from indoor cultivation to meet the state's GHG reduction target (specifically, to assist in achieving the SB 32 goal of reducing statewide GHG emissions to 40 percent below 1990 levels by December 31, 2030). The measure requires that the energy provided must be from any combination of the following sources: (a) on-grid power with 42 percent renewable sources; (b) on-site zero-net-energy renewable sources providing 42 percent of power; or (c) purchase of carbon offsets for any portion of power above 58 percent not from renewable sources; (d) the cultivator must demonstrate that the equipment used is 42

percent more energy efficient compared to standard equipment, using 2014 as a baseline year. The implementation of these measures would reduce the current baseline energy demand and associated GHG emissions for cannabis cultivation in the state. The method used to develop this measure is discussed in Chapter 2; note that CDFA intends to develop further guidance for how these requirements are to be interpreted and implemented.

In addition, several counties and cities, as referenced above in Section 4.6.2, have implemented more stringent energy use performance standards for cannabis cultivation operations. For example, Humboldt County requires 100 percent renewable energy use or carbon offsets for indoor operations. As a result, energy use and associated GHG emissions would likely be lower than baseline levels for many cultivators seeking a CDFA license under the Proposed Program.

Thus, the Proposed Program would increase the potential for attainment of the statewide GHG emission reduction goals of AB 32 and Executive Orders S-03-05 and B-16-2012, compared to baseline conditions, and would not be expected to conflict with local agencies' GHG plans and policies. The reduction in GHG emissions from implementation of these measures would be anticipated to more than offset any GHG emissions associated with increases in indoor cultivation under the Proposed Program. The requirements of the Proposed Program would also reduce the wasteful, inefficient, and unnecessary consumption of energy, and reduce energy demand and the need for additional energy resources. This impact would be **beneficial**.

Outdoor Cultivation

Impact GHG-2: Use off-road equipment and motor vehicles for outdoor cultivation activities, resulting in GHG emissions. (No Impact)

Outdoor cannabis cultivation, under both baseline conditions and the Proposed Program, would involve the use of fuel-powered equipment and motor vehicles that would generate GHG emissions and contribute to climate change impacts. As described in Impact GHG-1, little to no change in the amount of cannabis cultivation and corresponding GHG emissions is anticipated from implementation of the Proposed Program. The limits on use of generators would reduce emissions compared to the existing situation where some cultivators are using generators as a primary source of power. No information has been found or developed as part of the development of the Proposed Program regulations (e.g., estimates of changes in equipment usage or vehicle miles travelled) which would allow a clear conclusion of whether emissions from outdoor cultivation would increase, decrease, or stay the same under the Proposed Program, compared to baseline conditions. Because of this uncertainty, it has been concluded that outdoor cultivation would have **no impact**.

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4.7 Hazards, Hazardous Materials, and Human Health

4.7.1 Introduction

This section of the Program Environmental Impact Report (PEIR) presents the environmental setting and potential impacts of the California Department of Food and Agriculture's (CDFA's) CalCannabis Cultivation Licensing program (Proposed Program) related to hazards, hazardous materials, and human health.

Under federal and State laws, any material, including wastes, may be considered hazardous if it is specifically listed by statute as such, or if it is toxic (i.e., causes adverse human health effects), ignitable (i.e., has the ability to burn), corrosive (i.e., causes severe burns or damage to materials), or reactive (i.e., causes explosions or generates toxic gases). The term "hazardous material" is defined as any material that, because of quantity, concentration, or physical or chemical characteristics, poses a substantial present or potential hazard to human health and safety or to the environment if released into the workplace or the environment (California Health and Safety Code, Chapter 6.95, Section 25501[o]).

Information regarding hazards, hazardous materials, and human health presented in this section is primarily based on the following sources:

- *Human Health and Ecological Screening Risk Evaluation* (Blankinship & Associates and Ardea Consulting 2017), included as **Appendix F** of this PEIR;
- Agency webpages and fact sheets;
- Peer-reviewed or scientific journal articles; and
- Regulatory orders and agency publications.

4.7.2 Regulatory Setting

Federal Laws, Ordinances, Regulations, and Standards

Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, also called the Superfund Act) (42 U.S. Code [USC] Section 9601 et seq.) was established to protect the public and the environment from the effects of past hazardous waste disposal activities and new hazardous material spills. CERCLA created a tax on the chemical and petroleum industries to generate funds to clean up abandoned or uncontrolled hazardous waste sites in which no responsible party could be identified (U.S. Environmental Protection Agency [USEPA] 2016a). CERCLA also granted authority to USEPA to respond directly to hazardous waste spills and required those responsible for a spill or accidental release of hazardous materials to report the release to USEPA.

The Superfund Amendments and Reauthorization Act of 1986 (SARA) (Public Law 99-499) amended some provisions of CERCLA (USEPA 2016b). SARA increased the focus on human health problems posed by hazardous waste releases, stressed the importance of permanent

remedies and innovative treatment technologies in cleaning up hazardous waste sites, and encouraged greater citizen participation in making decisions on how sites should be cleaned up (USEPA 2016b). It is unlikely that commercial cannabis cultivators could spill or release hazardous materials in sufficient quantities to require placement of a site on the National Priorities List[1].

Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) (42 USC Section 6901 et seq.) was enacted in 1976 to address the increasing problems the nation faced from the growing volume of municipal and industrial solid waste (USEPA 2016c). The RCRA sets national goals for protecting human health and the environment from the potential hazards of waste disposal, conserving energy and natural resources, reducing the amount of waste generated, and ensuring that wastes are managed in an environmentally sound manner. To achieve these goals, the RCRA established three interrelated programs: the solid waste program, the hazardous waste program, and the underground storage tank program.

The hazardous waste program established a system for controlling hazardous wastes from the time they are generated to the time they are disposed of ("cradle-to-grave" management) (USEPA 2016c). Under the RCRA, owners and operators of hazardous waste treatment, storage, and disposal facilities must follow a set of standards (e.g., facility design and operation, contingency planning and emergency preparedness, and recordkeeping) to minimize risk and impacts on human health and the environment, codified in Title 40 of the Code of Federal Regulations (CFR), Part 264. Commercial cannabis cultivators would be subject to RCRA to the extent that they generate hazardous waste or store hazardous materials in underground storage tanks.

Emergency Planning and Community Right-to-Know Act—Toxic Release Inventory

Section 313 of the Emergency Planning and Community Right-to-Know Act (EPCRA) established the Toxic Release Inventory (TRI) (USEPA 2016d). TRI is a publicly available database containing information on disposal and other releases of toxic chemicals from industrial facilities. As stipulated in 40 CFR Part 372, owners or operators of facilities that release toxic chemicals above a certain threshold (25,000 pounds or more per year) are required to submit information about: (1) on-site releases and other disposals of toxic chemicals; (2) on-site recycling, treatment, and energy recovery associated with TRI chemicals; (3) off-site transfers of toxic chemicals from TRI facilities to other locations; and (4) pollution prevention activities at facilities. It is unlikely that cannabis cultivators could release toxic chemicals above the threshold requiring reporting under TRI.

Federal Insecticide, Fungicide, and Rodenticide Act

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) (7 USC Section 136 et seq.) was enacted in 1947, but has since been amended by the Federal Environmental Pesticide Control Act of 1972 and the Food Quality Protection Act of 1996. In its current form, FIFRA mandates USEPA to regulate the use and sale of pesticides to protect human health and the

[1] The National Priorities List is the list of national priorities for cleanup and remediation among the known or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States and its territories.

environment (USEPA 2017). USEPA achieves this mandate by registering and labeling pesticides.

Currently, no pesticides are registered for use on cannabis. Therefore, commercial cultivators are limited to only using pesticides that are exempt from residue-tolerance requirements and are either: (1) registered and labeled for a use that is broad enough to include use on cannabis (e.g., unspecified green plants), or (2) exempt from registration requirements as a minimum-risk pesticide under FIFRA Section 25(b).Commercial cannabis cultivators using registered pesticides would be required to follow the label instructions developed pursuant to FIFRA. Under FIFRA, all new pesticides (with minor exceptions) must be registered by the Administrator of USEPA through a process in which appropriate crops and sites for use of the pesticide are identified and prescribed based on research data (USEPA 2017). Labeling requirements control when and under what conditions pesticides can be applied, mixed, stored, loaded, or used; when a site can be reentered after application; and when crops can be harvested (USEPA 2017).

Occupational Safety and Health Administration Regulations

The Occupational Safety and Health Act of 1970 created the Occupational Safety and Health Administration (OSHA) to ensure safe and healthful conditions for workers by setting and enforcing standards and by providing training, outreach, education, and assistance (U.S. Department of Labor 2017a). To fulfill this purpose, OSHA develops and enforces mandatory job safety and health standards.

These standards, codified in 29 CFR Part 1910, address issues that range in scope from walking and working surfaces, to exit routes and emergency planning, to hazardous materials and personal protective equipment. They include exposure limits for a wide range of specific hazardous materials, including pesticides, as well as requirements that employers provide personal protective equipment (i.e., protective equipment for eyes, face, or extremities; protective clothing; respiratory devices) to their employees wherever it is necessary (i.e., when required by the label instructions) (29 CFR Section 1910.132).

OSHA standards also require that chemical manufacturers and importers obtain and develop Safety Data Sheets (SDSs) (formerly known as Material Safety Data Sheets) (29 CFR Section 1910.1200; U.S. Department of Labor 2017b). Employers must have an SDS in the workplace for each chemical they use (29 CFR Section 1910.1200). Commercial cannabis operations would be required to comply with OSHA regulations and standards, including worker personal protective equipment requirements.

State Laws, Ordinances, Regulations, and Standards

California Health and Safety Code—Hazardous Waste and Hazardous Materials

Several sections of the California Health and Safety Code deal with hazardous waste and hazardous materials. Division 20, Chapter 6.5 addresses hazardous waste control and contains regulations on hazardous waste management plans, hazardous waste reduction, recycling and treatment, and hazardous waste transportation and hauling. Under Chapter 6.5, Article 6, persons generating hazardous wastes that are to be transported for off-site handling, treatment, storage, or disposal must complete a hazardous waste manifest before transport, indicating the facility to which the waste is being shipped for treatment, disposal, or other purposes.

Under Chapter 6.95, Article 1, areas and businesses that have a threshold amount of hazardous materials on site (55 gallons of liquid; 500 pounds of solid for businesses) must have plans in place for emergency response to an accidental release of materials. These Hazardous Materials Business Plans (HMBPs) and Hazardous Materials Area Plans (HMAPs) must include at least the following:

- A listing of the chemical name and common names of every hazardous substance or chemical product handled by the business;
- The category of waste, including the general chemical and mineral composition, of every hazardous waste handled by the business;
- The maximum amount of each hazardous material or mixture containing a hazardous material that is present on site;
- Sufficient information on how and where the hazardous materials are handled by the business to allow fire, safety, health, and other appropriate personnel to prepare adequate emergency responses to potential releases of the hazardous materials;
- Emergency response plans and procedures in the event of a reportable release or threatened release of a hazardous material; and
- Training for all new employees and annual training, including refresher courses, for all employees on safety procedures in the event of a release or threatened release of a hazardous material.

Under Chapter 6.95, Article 2, operators of stationary sources of hazardous materials are required (if they are deemed an accident risk) to prepare risk management plans (RMPs), detailing strategies to reduce the risk of accidental hazardous material release, and submit them to the California Emergency Management Agency. Cannabis cultivators that stored hazardous materials (e.g., pesticides, fuel) exceeding the threshold quantity would be required to prepare an HMBP. In most cases, the local Certified Uniform Program Agency (CUPA) is the administering agency responsible for implementing the HMBP program. Data generated for HMBP compliance is managed through the statewide California Environmental Reporting System (CERS).

California Accidental Release Prevention Program

First implemented in 1997, the California Accidental Release Prevention (CalARP) program was designed to prevent accidental releases of hazardous substances, minimize damage if releases occur, and satisfy community right-to-know laws (California Office of Emergency Services [Cal OES] 2017). Similar to the chemical accident prevention provisions of the federal Clean Air Act, the CalARP program and implementing regulations (Title 19, Division 2, Chapter 4.5 of the California Code of Regulations [CCR]) require businesses that handle more than a threshold quantity of regulated substances to develop an RMP.

In most cases, the Certified Uniform Program Agency (CUPA) is the administering agency responsible for implementing the CalARP program. When no CUPA exists, the administering agency is designated by the Secretary of the California Environmental Protection Agency or the California Office of Emergency Services. The administering agency determines the level of detail in the RMPs, reviews the RMPs, conducts facility site inspections, and provides public access to most of the information provided by facilities.

California Fire Code—Hazardous Materials Management Plans and Hazardous Materials Inventory Statements

The California Fire Code (29 CCR Part 9) requires businesses that handle more than a threshold quantity of hazardous materials to prepare a Hazardous Materials Management Plan (HMMP) and a Hazardous Materials Inventory Statement (HMIS). HMMPs and HMISs are similar to the HMBPs and HMAPs required under Chapter 6.95 of the California Health and Safety Code. Similar to business and area plans, the HMMP/HMIS requirement is an element of the Unified Program; however, the California Department of Forestry and Fire Protection (CAL FIRE) Office of the State Fire Marshall is responsible for implementing the HMMP and HMIS (CAL FIRE 2013).

The HMMP must include a facility site plan containing information such as the location of emergency equipment, hazardous material storage tanks, and emergency exits. The HMIS must include information on the hazardous materials at the site, such as product name, chemical components, amount in storage, and hazard classification. As part of an application for a permit, owners or operators of facilities that handle hazardous materials also must submit an emergency response plan and an emergency response training plan. Commercial cannabis cultivation facilities that store or handle greater than threshold quantities of hazardous materials (e.g., pesticides, fuel) would be required to prepare an HMMP and HMIS.

California Emergency Services Act

The California Emergency Services Act (California Government Code, Chapter 7) established the California Emergency Management Agency and created requirements for emergency response training and planning. Under this act, the State is required to develop a statewide toxic disaster contingency plan that can facilitate an effective, multi-agency response to a situation in which toxic substances are dispersed in the environment so as to cause, or potentially cause, injury or death to a substantial number of persons or substantial harm to the natural environment (7 California Government Code, Section 8574.18). The California Emergency Services Act also requires the agency to develop and manage the California Hazardous Substances Incident Response Training and Education Program, which provides classes in hazardous substance response (7 California Government Code 8574.20). Under the California Emergency Services Act, the California Emergency Management Agency would have the ability to provide an effective response to a catastrophic hazardous materials release, such as from an accident at a pesticide or fertilizer manufacturing plant.

Hazardous Waste Generator Program

The Hazardous Waste Generator Program is administered by CUPAs under the Unified Program with oversight and assistance from the California Department of Toxic Substances Control (DTSC). Under the program, CUPAs conduct inspections at hazardous waste generator facilities. Inspectors check hazardous waste generators for compliance with such requirements as having a USEPA identification number, contingency plan information posted near a telephone, containers in good condition and properly labeled, and authorized waste transport vehicles (DTSC 2017). If generators fail to comply with regulations or permit requirements, CUPAs may assess penalties (DTSC 2002a).

CUPAs also administer on-site, tiered permitting programs. Based on the type of waste they treat and the treatment processes they employ, businesses are required to obtain a permit for the appropriate tier (DTSC 2002b). Permits may require businesses to clean equipment or alter processes to improve safety (DTSC 1999). Depending on their specific cultivation practices and processes, commercial cannabis cultivators could be considered hazardous waste generators that would be subject to the requirements of the Hazardous Waste Generator Program.

Pesticides and Pest Control Operations (3 CCR Division 6)

Detailed implementing regulations for the California Department of Pesticide Regulation's (CDPR's) pesticide regulatory program are codified in 3 CCR Division 6. CDPR is the state agency with primary responsibility for regulating pesticide use in California. CDPR oversees state pesticide laws, including pesticide labeling, and is vested by USEPA to enforce federal pesticide laws in California. CDPR also oversees the activities of the county agricultural commissioners (CACs) related to enforcement of pesticide regulations and related environmental laws and regulations locally.

As identified in 3 CCR Division 6, CDPR evaluates proposed pesticide products and registers those pesticides that it determines can be used safely. In addition, CDPR's oversight includes:

- Licensing of pesticide professionals;
- Site-specific permits required before restricted-use pesticides may be used in agriculture;
- Strict rules to protect workers and consumers;
- Mandatory reporting of pesticide use by agricultural and pest control businesses;
- Environmental monitoring of water and air; and
- Testing of fresh produce for pesticide residues.

The regulations require that employers of pesticide workers provide protective clothing, eyewear, gloves, respirators, and any other required protection, and also requires employers to ensure that protective wear is worn according to product labels during application. The regulations also require that employers provide field workers with adequate training in pesticide application and safety; communicate pesticide-related hazards to field workers; ensure that emergency medical services are available to field workers; and ensure adherence to restricted-entry intervals between pesticide treatments (3 CCR Section 6764). Under the Medical Cannabis Regulation and Safety Act (MCRSA) and Adult Use of Marijuana Act (AUMA), CDPR must require that the application of pesticides or other pest control in connection with the indoor or outdoor cultivation of cannabis complies with 3 CCR Division 6 (commencing with Section 11401) of the Food and Agricultural Code and its implementing regulations (Business and Professions Code 19332[f]). The proposed medical cultivation regulations affirm this requirement in Section 8313(e), which requires compliance with pesticide laws and regulations as enforced by CDPR.

CDPR Guidance on Pesticide Use in Cannabis Cultivation

In accordance with the MCRSA and AUMA, CDPR is required to develop guidelines for the use of pesticides in the cultivation of cannabis and establish limits for residue levels in harvested cannabis and cannabis products (B&P Code 19332[b]). However, CDPR is preempted by federal law from registering a pesticide for sale and use that is not first registered by USEPA. As discussed above, USEPA has not registered any pesticides for use on cannabis. Federal law also prohibits CDPR from establishing maximum pesticide tolerances for any cannabis that is used in food.

CDPR has advised CACs to issue a Unique Identifier (i.e., an operator identification data number) to any cannabis grower who submits a valid application, except in counties in which growing cannabis is prohibited by a local ordinance (CDPR 2016a). The operator identification data would be used in the management of pesticide use data. CDPR has advised that the use of a pesticide for the cultivation of cannabis falls under the broad definition of "agricultural use" in the Food and Agricultural Code, even though the Food and Agricultural Code does not explicitly consider cannabis an agricultural commodity (CDPR 2015).

CDPR has also prepared two documents outlining the legal requirements for pesticide use on cannabis and providing guidance on legal pest management practices for California cannabis growers. Essentially, CDPR's guidance states that the only pesticide products allowable for use on cannabis are those that contain an active ingredient that is exempt from residue-tolerance requirements and are either (1) registered and labeled for a use that is broad enough to include use on cannabis (e.g., unspecified green plants), or (2) exempt from registration requirements as a minimum-risk pesticide under FIFRA Section 25(b) and 3 CCR Section 6147 (CDPR 2016a). CDPR intends to update this list for use in the Proposed Program; Appendix F, *Human Health and Ecological Screening Risk Evaluation,* evaluates many of the pesticides that meet these criteria and that may be authorized for use under the Proposed Program.

With respect to rodenticides, CDPR's guidance finds that the following rodent repellants may be used in and around cannabis cultivation sites consistent with the label: capsicum oleoresin, putrescent whole egg solids, and garlic (CDPR 2016a). The mode of action for these repellants is related to the olfactory, ocular, and/or dermal irritation they cause, which results in nonlethal repellency and does not result in secondary poisoning. This is in contrast to the modes of action of other, substantially more lethal rodenticides such as diphacinone and chlorophacinone, which inhibit blood clotting and may result in secondary poisoning.

Pesticide Contamination Prevention Act

The Pesticide Contamination Prevention Act (Sections 13145–13152 of the Food and Agricultural Code) requires CDPR to:

- Obtain environmental fate and chemistry data for agricultural pesticides before they can be registered for use in California;
- Identify agricultural pesticides with the potential to pollute groundwater;
- Sample wells to determine the presence of agricultural pesticides in groundwater;

- Obtain, report, and analyze the results of well sampling for pesticides by public agencies;
- Formally review any detected pesticide to determine whether its use can be allowed; and
- Adopt use modifications to protect groundwater from pollution if formal review indicates that continued use can be allowed.

The act requires CDPR to develop numerical values for water solubility, soil adsorption coefficient, hydrolysis, aerobic and anaerobic soil metabolism, and field dissipation of pesticides to protect groundwater, based in part on data submitted by pesticide registrants.

The act also states that CDPR shall establish a list of pesticides that have the potential to pollute groundwater, called the Groundwater Protection List. Any person who uses a pesticide that is listed on the Groundwater Protection List is required to file a report with the CAC, and pesticide dealers are required to make quarterly reports to CDPR of all sales of pesticides on the list to persons not otherwise required to file a report. The Pesticide Contamination Prevention Act ensures that pesticides allowed for use in California, including those that may be used in cannabis cultivation, will have been studied by CDPR for their potential to contaminate groundwater and the environment.

Safe Drinking Water and Toxic Enforcement Act (Proposition 65)

The Safe Drinking Water and Toxic Enforcement Act, or Proposition 65, requires the Governor to maintain and publish a list of chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm. Once a chemical has been listed, businesses are responsible for providing a warning before knowingly or intentionally exposing their employees or the public to an amount of the chemical that poses a significant risk (CDPR 2016b). The California Office of Environmental Health Hazard Assessment (OEHHA) is the lead agency responsible for implementing Proposition 65, with input from CDPR and other agencies so that the best scientific information is used in listing chemicals. In its current state, the Proposition 65 list contains a wide variety of chemicals, including pesticides and cannabis smoke[2] (OEHHA 2016). Proposition 65 would require cannabis cultivators using substances on the Proposition 65 list to post warnings before exposing their employees or the public to significant quantities of such substances.

California Occupational Safety and Health Administration Regulations

The California Occupational Safety and Health Administration (Cal/OSHA) regulations contain requirements for agricultural operations related to pesticide application. The regulations require that a notice be attached to all tanks larger than 100 gallons in capacity that are used for pesticides, providing precautionary instructions; controls on the tanks must be placed to minimize exposure to employees from ruptured or breaking lines (8 CCR Section 3453). Machines, applicators, and other equipment used for pesticide application

[2] Cannabis smoke is listed on the Proposition 65 list as causing cancer, and has been listed since 2009. As stated throughout this PEIR, this environmental analysis is focused on the environmental effects of cultivating cannabis; the potential effects from smoking or consuming cannabis are discussed in Chapter 6, *Cumulative Considerations*.

must be decontaminated before they are overhauled or placed in storage (8 CCR Section 3451).

In addition, the Cal/OSHA regulations contain various provisions that require safe operation of equipment, safety instructions provided in a language that employees understand, and access to first aid. Any commercial cannabis cultivator that uses pesticides may be subject to these requirements.

California Fire Code

The California Fire Code (24 CCR Part 9) establishes minimum requirements to safeguard the public health, safety, and general welfare from the hazards of fire, explosion, or dangerous conditions in new and existing buildings. The California Fire Code also contains requirements related to emergency planning and preparedness, fire service features, building services and systems, fire resistance–rated construction, fire protection systems, and construction requirements for existing buildings, as well as specialized standards for specific types of facilities and materials. Structures used for indoor cultivation of cannabis under the Proposed Program would be subject to applicable sections of the California Fire Code.

Fire Prevention (California Government Code Sections 51175–51181)

Sections 51175–51181 of the California Government Code outline the responsibilities of CAL FIRE and local agencies with respect to fire prevention. CAL FIRE is legally responsible for providing fire protection on all State Responsibility Area (SRA) lands (CAL FIRE 2016a). SRA lands do not include lands within city boundaries or under federal ownership.

CAL FIRE Defensible Space Requirements

California law requires that homeowners in SRAs maintain defensible space[3] around their buildings to 100 feet. This requirement is designed to halt the progress of an approaching wildfire, as well as to keep firefighters safe while defending the structure (CAL FIRE 2016b). The law also requires that new homes be constructed with fire-resistant materials, such as fire-resistant roofing, enclosed eaves, and dual-paned windows. Any commercial cannabis cultivation structures located in SRAs would need to comply with these requirements.

Local Laws, Plans, Policies, and Regulations

Pesticide Regulatory Program—County Agricultural Commissioners

Although CDPR is responsible for managing California's statewide pesticide regulatory program, the local enforcement of pesticide use regulations is delegated to County Agricultural Commissioners (CACs). With oversight by CDPR, CACs plan and develop county programs and regulate pesticide use to ensure that applicators comply with label directions and pesticide laws and regulations (CDPR 2011). CACs oversee pesticide use reporting, promote best management practices, and monitor field applications, and they may assist in cleanup of accidental pesticide spills.

[3] Defensible space is generally defined as the natural and landscaped area around a structure that has been maintained and designed to reduce fire danger, such as through fire-resistant plant selection and pruning.

CACs inspect operations and records of growers, nonagricultural (including industrial and institutional) applicators, pest control dealers, agricultural pest control advisers (PCAs), farm labor contractors, and government agencies for compliance with worker protection standards and other pesticide safety requirements. CACs, assisted by CDPR, investigate incidents in which pesticides harm agricultural workers, people nearby, and the environment, including environmental damage (such as fish or wildlife kills) and water quality contamination. When an enforcement action is needed, CACs have the option to revoke or suspend the right of a company to do business in their county or to issue civil or criminal penalties (CDPR 2011).

License and certificate types issued by CDPR under the pesticide regulatory program include, but are not limited to, the following (CDPR 2017):

PCA license. Required to offer recommendation on any agricultural use of pesticides, to sell services as an authority on any agricultural use of pesticides.

Qualified applicator certificate (QAC). Required for government employees and some other categories of workers who apply or supervise the application of restricted pesticides for any purpose or on any property other than that provided by the definition of private applicator (see below); or by maintenance gardeners and some other employees who perform pest control incidental to their job or business.

Qualified applicator license (QAL). Required to apply or supervise the application of pesticides, including restricted-use pesticides, for any purpose or on any property other than that provided by the definition of private applicator (see below); or by anyone who supervises pesticide applications made by a licensed pest control business.

A certificate type issued by the CAC is as follows:

Private applicator certificate. Required for people who use or supervise the use of restricted-use pesticides, for the purpose of producing an agricultural commodity on property owned or leased by the applicator or the applicator's employer.

Because there are no restricted-use pesticides registered for use on cannabis, application of pesticides for cannabis cultivation would not require any type of license or certificate. Cultivators, however, may obtain a QAC or QAL, or private applicator certificate, or hire individuals with these credentials, in order to avail themselves of information such as proper mixing, loading, and application techniques and selection and use of personal protective equipment. Cannabis cultivators would not necessarily be required to obtain the services of a PCA but, nonetheless, may choose to do so in order to get professional advice on pest control.

Unified Program—Certified Unified Program Agencies

The Unified Program consolidates and coordinates several regulatory programs in California related to hazardous wastes and materials (California Environmental Protection Agency [Cal/EPA] 2012). Codified in 27 CCR Division 1 and Chapter 6.11 of the California Health and Safety Code, the Unified Program consolidates the following programs: HMBPs/HMAPs, CalARP, Underground Storage Tank, Aboveground Petroleum Storage Act,

Hazardous Waste Generator and Onsite Hazardous Waste Treatment (tiered permitting), and California Uniform Fire Code HMMPs and HMISs.

The Unified Program also transfers responsibility for implementation of these hazardous waste and materials regulatory programs to local agencies, such as cities and counties (Cal/EPA 2012). After local agencies are certified by Cal/EPA as CUPAs, they must establish a program that consolidates, coordinates, and makes consistent the administrative requirements, permits, inspection activities, enforcement activities, and hazardous waste and hazardous materials fees associated with programs under the Unified Program. With oversight from Cal/EPA, CUPAs conduct inspections for all program activities according to the standards contained in the relevant statute or regulation (Cal/EPA 2012).

Local Jurisdiction Ordinances on Cannabis Cultivation

Currently, local laws regarding cannabis cultivation vary substantially across the state. At the time of writing this Draft PEIR, some jurisdictions allow full commercial production of cannabis, whereas other jurisdictions prohibit commercial cannabis cultivation entirely, and many fall somewhere in between.

In areas where cannabis cultivation is permitted, many counties and cities include restrictions on storage, use, and disposal of hazardous materials. For example, Mendocino County requires that cultivators must comply with all laws and regulations related to use, storage, and disposal of hazardous materials or wastes, including but not limited to pesticides. El Dorado, Humboldt, Modoc, and Monterey Counties identify similar requirements. Several jurisdictions, likewise, require that hazardous materials storage areas be set back a minimum distance from drinking water wells. State law also requires cultivators to comply with laws and regulations, including those for pesticides.

Appendix E provides a summary of existing and proposed local ordinances on commercial cannabis cultivation.

4.7.3 Environmental Setting

Proximity to Schools

Schools are distributed throughout the state, generally in relation to population. Urbanized areas may have a large number of schools commensurate with denser populations, whereas rural areas typically have fewer school facilities spaced farther apart. Local jurisdictions vary in their zoning and land use regulations, and specific school sites in the state differ in their proximity to other types of land uses. A number of local governments have established restrictions on the siting of cannabis businesses near schools.

Hazardous Waste Sites and Clean-up Sites

Hazardous waste clean-up sites are located throughout the state. The State Water Resources Control Board's (SWRCB's) GeoTracker site identifies thousands of such sites, including leaking underground storage tank sites, military cleanup sites, and other types of hazardous waste contamination sites. These sites are commonly associated with certain types of historical land uses, such as gas stations, dry cleaning facilities, military bases, and other land uses that frequently use or store hazardous materials.

Airports

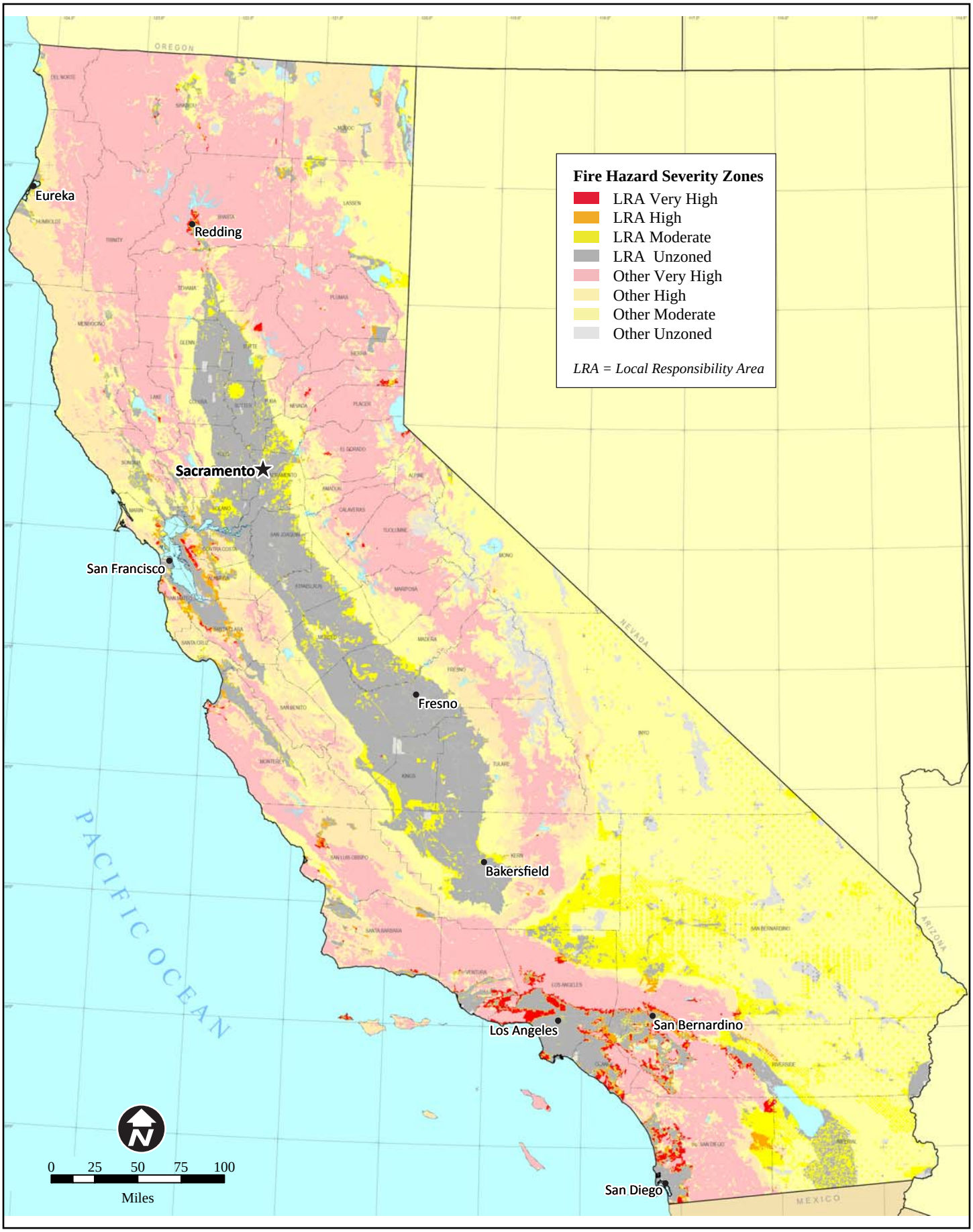
Airports are located throughout California, including major international airports in large metropolitan areas (San Diego, Los Angeles, the San Francisco Bay Area, and Sacramento) and smaller airports in various locations. Local jurisdictions typically site airport uses in accordance with zoning and general plan land use designations, and regulate land uses that are permitted in close proximity to airports. In addition to commercial airports, private airstrips may be located in various locations in the state, typically in less developed, more rural areas.

Fire Hazard

Wildland fire hazard varies in accordance with vegetation, climatic patterns, development, and other factors. **Figure 4.7-1** shows fire hazard in California, as mapped by CAL FIRE. As shown in Figure 4.7-1, many areas of the state are designated as Very High or High Fire Hazard Severity Zones, including much of the North Coast area of California and the so-called Emerald Triangle (consisting of Mendocino, Humboldt, and Trinity Counties), where cannabis cultivation has been widespread. The High and Very High Fire Hazard Severity Zone designations indicate that the physical conditions (e.g., vegetation, topography, weather, crown fire potential, ember production and movement) create a high likelihood that the area will burn over a 30- to 50-year period, and may burn at a high intensity and speed (CAL FIRE 2012).

Pesticide Usage in California

Pesticides are used throughout California—by state and local jurisdictions as well as private businesses and homeowners—for pest control around buildings and structures, protection of residential fruit trees, landscape maintenance, public health, sanitation, and commercial agriculture within and outside CDFA's purview. The types of pesticides used in California include a wide variety of chemicals of varying levels of toxicity, persistence, fate and transport properties, and other characteristics.



Source: CDFFP 2007

Figure 4.7-1
Statewide Fire Hazard Severity Zone Map

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4.7.4 Impact Analysis

Methodology

Impacts related to hazardous materials were analyzed qualitatively based on a review of the cultivation practices and associated equipment and materials that may be used as part of the Proposed Program. The analysis focused on the Proposed Program's potential to create hazards to humans through the transport, use, exposure, or accidental release of hazardous materials and exposure to other hazards such as fires. These were analyzed in the context of existing laws and regulations, and the extent to which these existing regulations and policies adequately address and minimize the potential impacts of the hazards associated with the Proposed Program.

A *Human Health and Ecological Screening Risk Evaluation* was conducted for the Proposed Program to assess the potential risks to human health from use of pesticides in cannabis cultivation (Blankinship & Associates and Ardea Consulting 2017). This risk evaluation is included as Appendix F of this PEIR, and has been used to support the impact conclusions related to these topics.

Significance Criteria

For the purposes of this analysis, based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines, the Proposed Program would result in a significant impact related to hazards, hazardous materials, and human health if it would:

A. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;

B. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;

C. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school;

D. Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Section 65962.5 of the Government Code and, as a result, create a significant hazard to the public or the environment;

E. For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, result in a safety hazard for people residing or working in the project area;

F. For a project within the vicinity of a private airstrip, result in a safety hazard for people residing or working in the project area; or

G. Expose people or structures to a significant risk of loss, injury, or death involving fire, including wildland fires and structure fires, and potential risks to first responders from fires.

Environmental Impacts of the Proposed Program

General Cultivation Impacts

Impact HAZ-1: Release hazardous materials from routine transport, use, and disposal. (Less than Significant)

Cannabis cultivation operations (both under baseline conditions and the Proposed Program) may involve the use of hazardous materials, such as fuel for power equipment and backup generators, and pesticides. Additionally, indoor and mixed-light cultivation operations may use high-powered lights, which could contain hazardous components that could enter the environment during disposal. Routine transport, handling, use, and disposal of these types of materials could expose people to hazards if adequate precautions are not taken.

Currently, evidence suggests that improper storage, use, and disposal of hazardous materials is a major problem at unpermitted cannabis cultivation sites. Enforcement activities have found substandard storage practices for hazardous materials (CDFW 2014a, 2014b), and law enforcement officials have observed that hazardous materials and/or hazardous waste are often dispersed throughout cultivation sites (Gabriel et al. 2013).

Current cannabis cultivation practices in California have been found to include the improper use of rodenticides, fungicides, herbicides, and insecticides, as documented by state agencies whose enforcement and investigation activities have focused primarily on outdoor grow operations and their impacts on the environment (NCRWQCB 2013, CVRWQCB 2014, SWRCB 2016).

In addition to endangering wildlife (see Section 4.4, *Biological Resources,* for additional discussion of this issue) and the environment (e.g., contamination of surface water bodies and groundwater; see Section 4.8, *Hydrology and Water Quality,* for additional discussion of this issue), such improper use, storage, and disposal of chemicals can endanger cannabis cultivation workers, as well as enforcement officers or members of the public who happen upon cultivation sites. Bodily contact or inhalation of these materials may cause illness or adverse health consequences.

As noted above, however, many of these impacts have been observed at unpermitted "trespass" grows and, therefore, are not necessarily indicative of what may occur under the Proposed Program, which would only allow lawful cultivation on private land. As described in Section 4.7.2, "Regulatory Setting," cultivators would be required to store, use, and dispose of hazardous materials in accordance with a broad range of applicable laws and regulations.

Depending on the size of the cultivation facility and nature of activities, licensees may be required to prepare an HMBP and/or HMMP. Additionally, licensees under the Proposed Program would be required to comply with OSHA and Cal/OSHA requirements, such as maintaining SDSs for each chemical they use and providing personal protective equipment, as necessary, to protect the health of workers.

Compliance with existing laws and regulations related to transport, use, and disposal of hazardous materials would avoid creating a substantial hazard to the public. In addition, the Proposed Program would require that applicants identify designated pesticide and other

agricultural chemical storage areas as part of their cultivation plan (Sections 8301[a][4] and 8302[a][5]). The Proposed Program regulations also would implement environmental protection measures which would limit potential releases of hazardous materials, including the following:

- Comply with all pesticide label directions;
- Store chemicals in a secure building or shed to prevent access; or
- Contain any chemical leaks and immediately clean up any spills.

CDFA would oversee licensee compliance through the inspection and enforcement methods contained in the proposed regulations from reports from CACs and other agencies.

Therefore, this impact would be **less than significant.**

Impact HAZ-2: Create a significant hazard through release of hazardous materials from upset or accident conditions. (Less than Significant)

As discussed above, cannabis cultivation operations may involve the use of hazardous materials, such as fuel for power equipment and generators, and pesticides. Transport, storage, and use of these materials could endanger human health and the environment in the event that upset or accident conditions cause a release of the materials.

As described in Section 4.7.2, "Regulatory Setting," numerous existing laws and regulations are designed to prevent spills of hazardous materials and limit damage in the event that such materials are released. The Proposed Program would only authorize lawful cultivation activities that comply with existing laws regarding storage and use of hazardous materials. California Health and Safety Code provisions and the CalARP program would require any cannabis cultivation facility storing more than a threshold quantity of regulated substances to prepare an HMBP and/or RMP. These plans would include emergency response procedures to coordinate response in the event of a release and chemical accident prevention measures.

With adherence to existing hazardous materials laws, the risk of accidental releases of hazardous materials from cultivation activities that could cause substantial hazards is considered low. In general, cannabis cultivation would not make intensive use of hazardous materials. In addition, the Proposed Program's environmental protection measures (Sections 8301[a][4], 8302[a][5], and 8313 of the proposed regulations, as provided in **Appendix A**) would minimize potential accidental releases of hazardous materials by requiring licensees to store chemicals in a secure building or shed, and to contain any chemical leaks and immediately clean up any spills. Therefore, the risk of accidental releases of hazardous materials from lawful cannabis cultivation operations would be lower than many other ongoing activities in the state, including existing unpermitted cannabis cultivation activities.

Therefore, this impact would be **less than significant.**

Impact HAZ-3: Cause health risks from pesticide use. (Less than Significant)

A screening-level human and ecological health risk evaluation conducted for the Proposed Program (Appendix F; Blankinship & Associates and Ardea Consulting 2017) found no significant risks to human or ecological health as a result of pesticide use by cannabis cultivators when used in accordance with licensing requirements and other applicable laws and regulations. The list of pesticides evaluated was derived from guidance provided by CDPR (2015, 2016a) and supplemented with information gathered during field site visits. Only pesticides that met the criteria of being exempt from tolerance, exempt from registration, and known to be used by cannabis cultivators were added to the list provided in guidance from CDPR.

As described in Appendix F, although cultivator exposure to certain chemicals could result in localized skin, eye, throat, or lung irritation, none of these effects would be anticipated to be significant. In general, the majority of pesticides evaluated in the risk assessment have histories of safe use, and all of these pesticides are exempt from food tolerance limits due in part to their substantially low toxicity (Blankinship & Associates and Ardea Consulting 2017). Notwithstanding, pesticide applicators should always read and follow pesticide label instructions and avail themselves of resources from CDPR such as the Pesticide Safety Information Series (PSIS).

In addition, the requirements contained in the proposed regulations (Sections 8313[e] and [f]) require compliance with pesticide laws and regulations as enforced by CDPR. For all pesticides that are compliant with CDPR's laws and regulations and are exempt from registration requirements, licensees will be required to comply with the following pesticide application and storage protocols relevant to human health and safety:

- Comply with all pesticide label directions;
- Store chemicals in a secure building or shed to prevent access by wildlife;
- Contain any chemical leaks and immediately clean up any spills;
- Apply the minimum amount of product necessary to control the target pest;
- Prevent offsite drift; and
- Only use properly labeled pesticides.

The regulations also require that if no label is available, the licensee must consult CDPR.

Many of the concerns regarding pesticide exposure for cannabis cultivators are exacerbated by the current, unlicensed cultivation operations that may use pesticides that would be unlawful to use under the Proposed Program. The proposed regulations limit both the types of pesticides that may be used, as well as direct the methods in which pesticides may be used. With these measures in place, in consideration of likely reductions in risk at many locations over baseline conditions, and based on the analysis contained in Appendix F, this impact would be **less than significant**.

Impact HAZ-4: Emit hazardous emissions or materials within 0.25 mile of a school. (Less than Significant)

Depending upon the specific locations of cannabis cultivation facilities under the Proposed Program, cultivation sites may be located within 0.25 mile of a school. Under the MCRSA and AUMA, cannabis cultivation facilities may not be sited within 600 feet of a school.

Additionally, some local jurisdictions require that cultivation sites not be located within 1,000 feet of a school. Both of these distances, however, are less than 0.25 mile, or 1,320 feet.

For cultivation sites that may be located within 0.25 mile of a school, cultivation activities have the potential to generate hazardous emissions (refer to Impacts HAZ-1 through HAZ-3, and AQ-2 for further discussion of the mechanisms and types of emissions that are possible). In summary, cannabis cultivation in these locations may use power equipment and gas- or diesel-powered generators, which could emit air contaminants, including toxic air contaminants, but these emissions would not be substantially different from emissions associated with other typical land uses that may occur in proximity to schools. Cultivation activities may generate odors, which may be a concern when emitted in proximity to schools for other reasons, but this would not be hazardous. Odor emissions are discussed further in Section 4.3, *Air Quality*.

Without knowing the specific location of individual cannabis cultivation facilities under the Proposed Program relative to a school, it is not possible to determine the exact quantities or concentrations of hazardous materials that could be used, or the extent to which schools could be exposed to such materials. Therefore, it is speculative to conclude that the impacts of such emissions could be substantial.

Additionally, there is a low probability that cannabis cultivation would emit substantial hazardous emissions based on the nature of such cultivation activities. Given MCRSA and AUMA requirements that cannabis facilities be located a minimum of 600 feet from existing and proposed schools, and the various Proposed Program measures and other legal requirements described throughout this section which would minimize the intentional or accidental release of emissions, there is no reason to believe that impacts related to emissions of hazardous materials near schools would be significant. To the extent that such impacts could occur, they would be considered based on site-specific information provided as part of the application process to determine if additional measures are needed to prevent or avoid significant impacts. Therefore, this impact would be **less than significant.**

Impact HAZ-5: Locate project activities on a hazardous materials site. (Less than Significant)

As noted in Section 4.7.3, "Environmental Setting," hazardous materials clean-up and/or contamination sites occur throughout the state and are typically associated with past land uses involving use or storage of hazardous materials, such as gas stations, military bases, or dry-cleaning facilities. Siting of cannabis cultivation sites in relation to hazardous materials sites would be determined through local land use permitting and environmental review; therefore, substantial adverse impacts associated with such activities being located on a hazardous materials site are speculative and not anticipated. The Proposed Program regulations (Section 8102[b][19]) would require that applicants have conducted a hazardous materials record search of the Envirostor database for the proposed premises. If hazardous sites were encountered, the regulations require that applicants provide documentation of protocols implemented to protect employee health and safety. Therefore, this impact would be **less than significant**.

Impact HAZ-6: Locate project activities near an airport or private airstrip such as to increase hazards. (Less than Significant)

Siting of cannabis cultivation operations in relation to airports or private airstrips would be determined through local land use permitting and environmental review. In general, cannabis cultivation operations would not include tall structures, substantial sources of glare or dust, or other characteristics that could interfere with air traffic. Therefore, this impact would be **less than significant.**

Impact HAZ-7: Expose people or structures to substantial risk of loss from wildfire. (Less than Significant)

Cannabis cultivation sites (under both baseline conditions and the Proposed Program) may be located in areas of high risk for wildfire. As shown in Figure 4.7-1, many parts of California are designated as Very High or High Fire Hazard Severity Zones, either in local responsibility areas or other areas, including SRAs. This includes much of the North Coast of California and the Emerald Triangle, where cannabis cultivation is prevalent.

In general, cannabis cultivation under the Proposed Program would only be permitted on private land; however, cultivation sites could be located near large tracts of State or federal land, or at the urban-wildland interface. In these locations, wildfires would not be uncommon and may threaten people or structures in the area.

Cannabis cultivation (under both baseline conditions and the Proposed Program) also could increase risk of fire and/or introduce ignition sources or flammable materials to an area. In particular, indoor cultivation practices could generate large electrical loads from high-intensity lights and other growing equipment, which could increase risk of an electrical fire. As described in detail in Section 4.11, *Public Services,* in Impact PS-5, numerous fires have occurred at indoor grow operations, particularly at residences with faulty or substandard wiring as the primary cause. Outdoor and/or mixed-light cultivation operations may involve the use of power equipment or gas- or diesel-fueled generators, which may generate a spark or provide flammable materials to any possible ignition source.

With respect to the increment of change from baseline conditions relative to the Proposed Program, the proposed regulations and increased compliance with other laws and regulations would reduce many of these impacts of cannabis cultivation related to wildfire risk. As described in Impact PS-5, under the Proposed Program, indoor cultivation operations would be required to adhere to State and local building, electrical, and fire codes. (Under Section 8102[b][10] of the proposed regulations, the local jurisdiction in which the business is proposing to operate is required to provide certification that the applicant is in, or will be in compliance with all local ordinances and regulations including the General Plan, zoning ordinances, building code standards, noise ordinances, and land use plans.) Indoor cultivators would also need to attest that the local fire department has been notified of the cultivation site (Section 8102[b][30] of the proposed regulations). The combination of these existing regulations and protective measures would reduce fire risk from indoor grow operations to a less-than-significant level. Fire risk from outdoor and/or mixed-light cultivation would not be substantially different from that posed by other agricultural activities that use similar equipment and practices.

While cannabis cultivation operations located in rural areas, areas designated as High Fire Hazard Severity Zones, or at the urban-wildland interface could expose workers and structures at the site to risk of loss from wildfire, this hazard would not be substantially worse than that for other types of land uses in the same areas, and would be reduced compared to cannabis cultivation occurring under baseline conditions. Existing laws, such as requirements for maintenance of defensible space around structures in SRA, and implementation of environmental protection measures specified in the Proposed Program regulations would be anticipated to reduce potential impacts.

Therefore, this impact would be **less than significant**.

Indoor Cultivation

Impact HAZ-8: Create substantial hazards for firefighters and first responders from indoor cultivation. (Less than Significant)

In addition to increased fire risk from indoor cultivation, which is described in Impact HAZ-7 and more extensively in Impact PS-5, firefighters have expressed concern regarding hazards to firefighters at buildings, particularly residences, used for cannabis cultivation. The following factors were noted in the literature regarding increased risk to first responders from incidents at grow operations under baseline conditions:

Electrical hazards: In the past, indoor cultivation operations have had exposed wiring, terminals, or connections due to substandard modifications to the structure's electrical system (Gustin 2010). In addition, high-intensity lights (e.g., high-voltage mercury vapor or high-pressure sodium lamps) may require their own igniter, capacitor, and transformer. Capacitors retain a charge even after power is cut off to the equipment; therefore, firefighters risk electrocution if they make bodily contact with a metal tool or direct a stream of water on this equipment at close range. Finally, illegal diversion of electrical service, which has been commonly observed at unpermitted indoor grow operations, can make it difficult or impossible for firefighters to effectively cut off power to a grow operation before entering (Gustin 2010).

Fire behavior: Typically, grow houses are extensively insulated to increase the efficiency of heating, ventilation, and air conditioning systems (Gustin 2010). Windows are also commonly covered or blocked for security purposes, to improve insulation, and/or to facilitate manipulation of the photoperiod. According to Gustin (2010), these types of environments can hasten flashover[4] conditions, which can pose a hazard to firefighters.

Falling, tripping, and entanglement hazards: To mask the smell of cannabis or allow for improved circulation in indoor grow operations, growers have commonly cut holes in the floors to extend ductwork from the basement or between floors (Gustin 2010; Durbin 2016). This may present a falling hazard for firefighters responding to the scene of a fire, particularly in smoky conditions, because the firefighter may not be anticipating such hazards in a residential home. Likewise, indoor grow operations may

[4] Flashover is defined as the near-simultaneous ignition of most of the directly exposed combustible material in an enclosed area. Flashover occurs when most of the exposed surfaces in a space are heated to their auto-ignition temperature and emit flammable gases.

have extended wiring to various pieces of electrical equipment, as well as irrigation tubing and flexible ductwork, all of which may pose tripping or entanglement hazards to firefighters operating in low-visibility conditions (Gustin 2010).

Explosion hazards: Indoor grow operations may have one or more pressurized gas cylinders (e.g., carbon dioxide [CO_2], propane-fueled CO_2 generator), which can explode if exposed to fire (Gustin 2010; Police Foundation 2015). This can pose a hazard to firefighters, particularly if they are not expecting such materials in a residential environment.

Mold: The air quality inside indoor grow operations has been cited as a concern for firefighters (Gustin 2010; Durbin 2016; Police Foundation 2015). Due to poor irrigation and ventilation practices, indoor grow operations may have high levels of mold spores present in the air. More than 60 percent of the indoor grow operations sampled for a study in Colorado had mold spore levels or Penicillium spore levels that exceeded outdoor levels by at least 10 times (Martyny et al. 2010). In some cases, the levels were in excess of 100 times the outdoor level, and levels were increased during "tear-out" of the grow operations. Failure to utilize respiratory protection could result in respiratory irritation, headache, difficulty breathing, chest tightness, and other symptoms caused by the mold exposure (Martyny et al. 2010).

Oxygen deficiency: Indoor grow operations may be oxygen-deficient due to the practice of increasing the CO_2 concentration in the growing environment to increase yields. While the normal CO_2 level in the outside air ranges from 300 parts per million (ppm) to 400 ppm, in cannabis grow operations it is desirable to have levels of CO_2 from 700 ppm to as much as 2,000 ppm (Martyny et al. 2010). Increasing the CO_2 concentration to such levels may result in an oxygen-deficient atmosphere (Gustin 2010), which could pose an asphyxiation hazard to firefighters or other first responders.

All of the concerns described above are real and have been encountered in the field by firefighters responding to fires at indoor cannabis grow operations. Many of these issues, however, are related to or exacerbated by the unpermitted nature of many indoor grow operations and noncompliance with building and fire codes. Under the Proposed Program, licensed indoor cultivation sites would not be allowed to have exposed wiring or stolen electrical wire taps. Substandard ductwork also would not be permitted, although the codes may not necessarily address tripping hazards to first responders posed by ductwork and irrigation tubing. Likewise, mold levels at indoor cultivation sites would be reduced as a result of more responsible cultivation practices under the Proposed Program; however, elevated mold levels may still be possible. Risks associated with grow lights and elevated CO_2 levels would remain. As such, legal indoor grow operations may still present unique hazards to firefighters.

Overall, in comparison to baseline conditions, it is anticipated that implementation of the Proposed Program would reduce the potential for firefighters to encounter hazards at indoor cultivation sites. Compared to the unpermitted or quasi-legal operations that exist today, as described above in Impact HAZ-7 licensed facilities under the Proposed Program would be required to have certification from the local jurisdiction that they comply with building, electrical, and fire codes, which would require installation of fire suppression systems, where appropriate. In addition, indoor cultivators would need to attest that the local fire department has been notified of the cultivation site (Section 8102[b][30] of the

proposed regulations), which would help ensure that local firefighters are aware of the risks posed by cannabis cultivation operations so that they may respond more effectively and safely.

With implementation of these requirements, and in consideration of likely reductions in risk at many locations over baseline conditions due to the Proposed Program, this impact would be **less than** significant.

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4.8 Hydrology and Water Quality

4.8.1 Introduction

This section of the Program Environmental Impact Report (PEIR) presents the regulatory setting, environmental setting, and potential impacts of the California Department of Food and Agriculture's (CDFA's) CalCannabis Cultivation Licensing program (Proposed Program) related to hydrology and water quality.

Information regarding hydrology and water quality presented in this section is based on numerous sources, including:

- *Human Health and Ecological Screening Risk Evaluation* (Blankinship & Associates and Ardea Consulting 2017), included as **Appendix F** of this PEIR;
- Agency webpages and fact sheets;
- Published scientific studies and peer-reviewed academic journal articles; and
- Regulatory orders and agency publications.

4.8.2 Regulatory Setting

Federal Laws, Regulations, and Standards

Clean Water Act and Associated Programs

The Federal Water Pollution Control Act of 1972, also known as the Clean Water Act (CWA), is the primary federal law that protects the quality of the nation's surface waters, including lakes, rivers, and coastal wetlands (U.S. Environmental Protection Agency [USEPA] 2016a). The objective of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." States, territories, and authorized Tribes establish water quality standards that describe the desired condition of a waterbody or the level of protection, which are then approved by USEPA; these standards form a legal basis for controlling pollution that enters the waters of the United States. Water quality standards consist of the designated beneficial uses of the waterbody, criteria to protect those designated uses, antidegradation requirements to protect existing uses and high-quality waters, and general policies regarding implementation (USEPA 2016b).

USEPA is responsible for implementing the CWA, although some sections are implemented by other federal agencies under USEPA's oversight, such as Section 404 dealing with discharge of dredged and fill material into waters of the United States (which is implemented by the U.S. Army Corps of Engineers). USEPA also has the option to delegate implementation of certain programs to a State agency. In California, the State Water Resources Control Board (SWRCB) and its nine regional water quality control boards (RWQCBs) administer various sections of the CWA.

The discussion below specifies provisions of the CWA that may relate to cultivation activities. Of particular relevance are Sections 401, 402, 404, and 303.

Section 401

CWA Section 401 requires an evaluation of water quality when a proposed activity requiring a federal license or permit could result in a discharge to waters of the United States. In California, USEPA has delegated to SWRCB and the RWQCBs the authority to issue water quality certifications. Each RWQCB is responsible for implementing Section 401 in compliance with the CWA and that region's water quality control plan (also known as a Basin Plan). Applicants for a federal license or permit to conduct activities that might result in the discharge to waters of the United States must also obtain a Section 401 water quality certification to ensure that any such discharge would comply with the applicable provisions of the CWA.

Section 404

CWA Section 404 regulates the discharge of dredged and fill materials into waters of the U.S., which include all navigable waters, their tributaries, and some isolated waters, as well as some wetlands adjacent to the aforementioned waters (33 CFR Section 328.3). Areas typically not considered to be jurisdictional waters include non-tidal drainage and irrigation ditches excavated on dry land, artificially irrigated areas, artificial lakes or ponds used for irrigation or stock watering, small artificial waterbodies such as swimming pools, and water-filled depressions (33 CFR Part 328). Areas meeting the regulatory definition of waters of the U.S. are subject to the jurisdiction of USACE under the provisions of CWA Section 404. Construction activities involving placement of fill into jurisdictional waters of the U.S. are regulated by USACE through permit requirements. No USACE permit is effective in the absence of state water quality certification pursuant to Section 401 of the CWA.

With respect to cannabis cultivation, dredge or fill activities within waters of the U.S. would primarily be associated with site development (e.g., access road crossings of creeks), and not cultivation activities themselves, which would have less potential to result in dredge or fill within jurisdictional waters.

Section 402

Section 402 of the CWA establishes the National Pollutant Discharge Elimination System (NPDES). Under Section 402, a permit is required for point-source discharges of pollutants into navigable waters of the United States (other than dredge or fill material, which are addressed under Section 404). In California, the NPDES permit program is also administered by the SWRCB. Permits contain specific water quality–based limits and establish pollutant monitoring and reporting requirements. Discharge limits in NPDES permits may be based on water quality criteria designed to protect designated beneficial uses of surface waters, such as recreation or supporting aquatic life. The various NPDES permits that may apply to the Proposed Program are discussed below.

NPDES General Permit for Construction Activities

Most construction projects that disturb 1 acre or more of land are required to obtain coverage under the SWRCB's *General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities* (Order 2009-0009-DWQ, as amended by 2010-0014-DWQ and 2012-0006-DWQ – "Construction General Permit") (SWRCB 2009). The Construction General Permit requires the applicant to file a Notice of Intent to discharge stormwater and prepare and implement a stormwater pollution prevention plan (SWPPP).

The SWPPP must include a site map and a description of the proposed construction activities; demonstrate compliance with relevant local ordinances and regulations; and present a list of best management practices (BMPs) that will be implemented to prevent soil erosion and protect against discharge of sediment and other construction-related pollutants to surface waters.

Permittees are further required to conduct monitoring and reporting to ensure that BMPs are implemented correctly and are effective in controlling the discharge of construction-related pollutants. Additionally, if a project that receives coverage under the Construction General Permit is located in an area that is not subject to a municipal stormwater permit (described below), the project must implement post-construction stormwater controls in accordance with permit Section XIII, Post-Construction Standards.

Construction of facilities that may eventually be used for licensed cultivation under the Proposed Program, if that construction involves construction and/or land disturbance activities on 1 acre or more of land, may require coverage under the Construction General Permit. The Construction General Permit would not apply to cultivation itself.

NPDES Permits for Municipal Stormwater Discharges

The Municipal Storm Water Permitting Program regulates stormwater discharges from municipal separate storm sewer systems (MS4s). Stormwater is runoff from rain or snow melt that runs off surfaces such as rooftops, paved streets, highways, or parking lots, and it can carry with it pollutants such as oil, pesticides, sediment, trash, bacteria, and metals. This runoff ultimately may reach surface waterbodies.

The municipal or urban areas addressed by the MS4 permit program commonly include large areas of impervious surface. These large impervious surfaces can contribute to increased pollutant loads, with results such as turbid water, nutrient enrichment, bacterial contamination, increased temperature, and accumulation of trash. In addition, these impervious areas can contribute to an increase in runoff duration, volume, and velocity, and streams may be affected by streambed scouring, sedimentation, and loss of aquatic and riparian habitat.

MS4 permits were established in two phases. Under Phase I, which started in 1990, the RWQCBs adopted NPDES permits for medium-sized (serving 100,000-250,000 people) and large (serving more than 250,000 people) municipalities. Most of these permits have been issued to groups of co-permittees, encompassing entire metropolitan areas. Phase I MS4 permits generally require the discharger to develop and implement a Storm Water Management Plan/Program with the goal of reducing the discharge of pollutants to the maximum extent practicable (MEP). MEP is the performance standard specified in Section 402(p) of the CWA. These management programs specify measures used to address various program areas, including public education and outreach; illicit discharge detection and elimination; construction and post-construction; and good housekeeping for municipal operations. MS4 permits themselves may specify management measures for the program areas, eliminating the need for dischargers to develop a Storm Water Management Plan/Program. In general, medium-sized and large municipalities also are required to conduct monitoring.

Under Phase II, the SWRCB issued the first General Permit for the Discharge of Storm Water from Small MS4s (WQ Order No. 2003-0005-DWQ) in 2003, to provide permit coverage for smaller municipalities (population less than 100,000), including nontraditional Small MS4s, which are facilities such as military bases, public campuses, and prison and hospital complexes. The current Phase II Small MS4 General Permit, *NPDES General Permit No. CAS000004, Waste Discharge Requirements (WDRs) for Storm Water Discharges from Small MS4s,* was adopted in 2013 (SWRCB 2013). The Phase II Small MS4 General Permit addresses Phase II permittees statewide.

Proposed Program activities may occur in locations with permit coverage under the MS4 program and as such, licensed cultivation activities may be subject to the requirements of such permits with regard to their stormwater discharges.

Section 303

Section 303 of the federal CWA (as well as the State-level Porter-Cologne Act, discussed further below) requires that California adopt water quality standards. In addition, under CWA Section 303(d), states are required to identify a list of "impaired waterbodies" (those not meeting established water quality standards), identify the pollutants causing the impairment, establish priority rankings for waters on the list, and develop a schedule for preparation of control plans to improve water quality. USEPA then approves or modifies the state's recommended list of impaired waterbodies. Each RWQCB must update its Section 303(d) list every 2 years. Waterbodies on the list are defined to have no further assimilative capacity for the identified pollutant, and the Section 303(d) list identifies priorities for development of pollution control plans for each listed waterbody and pollutant.

The pollution control plans mandated by the CWA Section 303(d) list are called Total Maximum Daily Loads (TMDLs). The TMDL is a "pollution budget," designed to restore the health of a polluted waterbody and provide protection for designated beneficial uses. The TMDL also contains the target reductions needed to meet water quality standards and allocates those reductions among the pollutant sources in the watershed (i.e., point sources, nonpoint sources, and natural sources) (40 Code of Federal Regulations [CFR] Section 130.2). A TMDL is unique to a specific waterbody and its surrounding pollutant sources and is not applicable to other waterbodies.

The current effective USEPA-approved Section 303(d) list for waterbodies in California is the 2010 list, which received final approval by USEPA on October 11, 2011 (SWRCB 2011a). For the Proposed Program, cultivation activities that may result in discharge of a contaminant to waterbodies listed as impaired for that contaminant would be of particular concern because of the waterbodies' lack of assimilative capacity for that contaminant.

National Toxics Rule and California Toxics Rule

USEPA issued the National Toxics Rule (NTR) in 1992. The goal of the NTR is to establish numeric criteria for specific priority toxic pollutants, to ensure that all states comply with the requirements in CWA Section 303. A total of 126 priority toxic pollutants currently are specified in the NTR (USEPA 2016f).

In 2000, USEPA promulgated the California Toxics Rule (CTR), which contains additional numeric water quality criteria for priority toxic pollutants for waters in the state. The CTR

fills a gap in California water quality standards that was created in 1994 when a State court overturned the State's water quality control plans containing water quality criteria for priority toxic pollutants. These federal criteria are legally applicable in California for inland surface waters, enclosed bays, and estuaries for all purposes and programs under the CWA (USEPA 2016c).

The NTR and CTR include toxicity thresholds for freshwater and saltwater systems and human health for a number of chemicals which may be used for permitted or unpermitted cannabis cultivation, including heavy metals (which may be found in fertilizers, irrigation water, soils, and other grow media), hydrocarbons (found in fuels and lubricants for powered equipment used in cultivation), and pesticides.

Federal Antidegradation Policy

The federal antidegradation policy includes minimum criteria to protect existing beneficial uses, ensure that the level of water quality is offset to maintain existing uses, and prevent degradation of water quality. This policy stipulates that states must adopt the following minimum provisions and allows states to adopt even more stringent rules (40 CFR Part 131):

> (1) Existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.
>
> (2) Where the quality of waters exceed levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality shall be maintained and protected unless the state finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the state's continuing planning process, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located.
>
> (3) Where high quality waters constitute an outstanding National resource, such as waters of National and state parks, wildlife refuges, and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.

Permits issued by the SWRCB and RWQCBs under the CWA or Porter-Cologne Act, including permits for activities conducted in accordance with the Proposed Program, must incorporate provisions to ensure this policy is met.

Safe Drinking Water Act

The Safe Drinking Water Act (SDWA) is intended to protect drinking water and its sources: rivers, lakes, reservoirs, springs, and groundwater wells that serve more than 25 individuals. The goal of the SDWA is to ensure that drinking water is safe for human consumption and will not have adverse health effects on the typical person who drinks water. Under the SDWA, USEPA has set drinking water standards for chemical, microbiological, radiological, and physical contaminants in its National Primary Drinking Water Regulations (40 CFR Part 141). Runoff from cannabis cultivation sites has potential

to contain water quality constituents that are regulated under the SDWA, such as nutrients and hydrocarbons.

State Agencies, Laws, and Programs

Porter-Cologne Water Quality Control Act

Effective in January 1970, the Porter-Cologne Act (California Water Code Division 7) created water quality regulation on the State level, establishing the SWRCB and dividing California into nine regions, each overseen by an RWQCB. The act establishes regulatory authority over waters of the State, defined as "any surface water or groundwater, including saline waters, within the boundaries of the state" (SWRCB 2017a). More specifically, the SWRCB and RWQCBs have jurisdiction over any surface water or groundwater to which a beneficial use may be assigned. Following enactment of the federal CWA in 1972, the Porter-Cologne Act assigned responsibility for implementing CWA Sections 303, 401, and 402 to the SWRCB and RWQCBs.

The Porter-Cologne Act requires the RWQCBs to adopt water quality control plans (Basin Plans) for the protection of surface water and groundwater quality. The act also authorizes the RWQCBs to issue waste discharge requirements (WDRs) for discharges to waters of the state, including NPDES permits. Any activity, discharge, or proposed activity or discharge from a property or business that could affect California's surface water, coastal waters, or groundwater will (in most cases) be subject to a WDR. The California Water Code authorizes the SWRCB and RWQCBs to conditionally waive WDRs if this is in the public interest. Discharges made under the Proposed Program may be subject to WDR requirements.

Cannabis Cultivation Regulation

Pursuant to the Medical Cannabis Regulation and Safety Act (MCRSA) and the Adult Use of Marijuana Act (AUMA), the SWRCB and RWQCBs are developing a regulatory program to protect waters of the State from harmful activities that could result from cannabis cultivation (SWRCB 2017b). As stated above, SWRCB and the nine RWQCBs are the primary agencies tasked with water regulation and water quality protection; therefore, while CDFA is the lead agency for this PEIR, potential water quality and related impacts from cannabis cultivation remain under the water agencies' primary jurisdiction. SWRCB's and RWQCB's regulatory program would prohibit waste discharges from cannabis-related agricultural practices, land clearing, and grading activities in rural areas and forests (SWRCB 2016c). SWRCB is anticipated to issue guidance similar to (and building off of) the general orders that have already been adopted by the North Coast (NC) RWQCB and Central Valley (CV) RWQCB. The SWRCB's guidance would apply to cannabis cultivation sites statewide.

SWRCB intends to establish this guidance concurrent with issuance of licenses for cannabis cultivation (January 1, 2018). In the interim period while the guidance is being established, other permits (e.g., General Construction Permit, General Industrial Permit, Irrigated Lands Regulatory Program, MS4 permits, general permits established by the NCRWQCB and CVRWQCB, and/or individual WDRs) may apply to cannabis cultivation activities.

State Drinking Water Standards

Title 22, Division 4, Chapter 15, of the California Code of Regulations establishes parameters for safe drinking water throughout the state. These drinking water standards are similar to,

but in many cases more stringent than, federal standards. Title 22 contains both primary standards, and secondary standards related to aesthetics (taste and odor). These standards include limits for water quality parameters that may be found in runoff from permitted or unpermitted cultivation sites, such as heavy metals, pesticides, petroleum hydrocarbons, color, foaming agents, turbidity, and total dissolved solids/specific conductance.

Policy for Implementation of Toxics Standards in Inland Surface Waters, Enclosed Bays, and Estuaries of California

In 1994, SWRCB and USEPA agreed to a coordinated approach for addressing priority toxic pollutants in inland surface waters, enclosed bays, and estuaries of California. In March 2000, SWRCB adopted the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California, commonly referred to as the State Implementation Policy. This policy implements NTR and CTR criteria and applicable Basin Plan objectives for toxic pollutants. When an RWQCB issues any permit allowing the discharge of any toxic pollutant(s) in accordance with the CWA or the Porter-Cologne Act, the permit's promulgation and implementation must be consistent with the State Implementation Policy's substantive or procedural requirements. Any deviation from the State Implementation Policy requires the concurrence of USEPA if the RWQCB is issuing any permit under the CWA. Consistency with the State Implementation Policy would occur when water permits are issued for Proposed Program activities.

California Antidegradation Policy

SWRCB enacted the Statement of Policy with Respect to Maintaining High Quality of Waters in California, which is also referred to as the California antidegradation policy. This policy is used to ensure that high-quality water is maintained, and it limits the discharge of pollutants into high-quality water in the state (Resolution Number 68-16; SWRCB 1968), as follows:

> (1) Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water and will not result in water quality less than that prescribed in the policies.
>
> (2) Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.

Similar to the federal antidegradation policy (described above), permits issued by SWRCB and the RWQCBs under the CWA or Porter-Cologne Act for activities conducted under the Proposed Program must incorporate provisions to ensure that this State-level policy is met.

California Pesticide Management Plan for Water Quality

The California Pesticide Management Plan for Water Quality is a joint effort between the California Department of Pesticide Regulation (CDPR), county agricultural commissioners, SWRCB, and the RWQCBs to protect water quality from pesticide pollution. To reduce the possibility of pesticides entering groundwater or surface water, a four-stage approach was designed by CDPR and SWRCB. Stage 1 involves educational outreach to the community to prevent pesticide contamination in water supplies. Stage 2 occurs after pesticides are detected in a water supply, and an appropriate response is selected that is safe and site specific. If Stage 2 is not effective, then Stage 3 tactics are employed, which include implementing restricted material use permit requirements, regulations, and other regulatory authority by CDPR and the county agricultural commissioners. In addition, SWRCB and the RWQCBs can employ Stage 4 and a variety of water quality control planning programs and other regulatory measures to protect water quality as necessary (CDPR 1997).

Surface Water Protection Program

CDPR implements the California Pesticide Management Plan for surface water protection through its Surface Water Protection Program, under a Management Agency Agreement with SWRCB. The Surface Water Protection Program is designed to characterize pesticide residues, identify contamination sources, determine flow of pesticides to surface water, and prepare site-specific mitigation measures. The program addresses both agricultural and nonagricultural sources of pesticide residues in surface waters. It has preventive and response components that reduce the presence of pesticides in surface waters. The preventive component includes local outreach to promote management practices that reduce pesticide runoff. Prevention also relies on CDPR's registration process, in which potential adverse effects on surface water quality, and particularly those in high-risk situations, are evaluated. The response component includes mitigation options to meet water quality goals, recognizing the value of self-regulating efforts to reduce pesticides in surface water as well as regulatory authorities of CDPR, SWRCB, and the RWQCBs (CDPR 1997, 2013a).

Pesticide Contamination Prevention Act

The Pesticide Contamination Prevention Act, approved in 1985, was developed to prevent further pesticide contamination of groundwater from legal agricultural pesticide applications. The act defines pesticide pollution as "the introduction into the groundwaters of the state of an active ingredient, other specified product, or degradation product of an active ingredient of an economic poison above a level, with an adequate margin of safety that does not cause adverse health effects." CDPR has compiled a list of pesticide active ingredients on the Groundwater Protection List that have the potential to pollute groundwater. These various pesticides are reviewed and their use is modified when they are found in groundwater (CDPR 1997).

Groundwater Protection Program

CDPR implements the Pesticide Contamination Prevention Act through its Groundwater Protection Program, which is coordinated with SWRCB under the California Pesticide Management Plan. The Groundwater Protection Program evaluates and samples pesticides to determine whether they may contaminate groundwater, identifies areas sensitive to

pesticide contamination, and develops mitigation measures to prevent the movement of pesticides. CDPR may adopt regulations to carry out these mitigation measures. CDPR conducts four groundwater monitoring programs. The first monitors whether pesticides on the Groundwater Protection List with the potential to pollute have been found in groundwater. The second type is four-section monitoring, which monitors wells in the vicinity of a contaminated well. The third monitoring type is sensitive-area monitoring that identifies areas sensitive to pesticide pollution. The fourth type is investigative monitoring, used to identify and understand the factors that affect pesticide movement into groundwater (CDPR 1997).

State Water Rights System

SWRCB administers a water rights system for the diversion of surface waters (springs, streams, and rivers), including diversion of water from subterranean streams flowing in known and definite channels. The granting of a water right provides permission to withdraw water from a river, stream, or groundwater source for a "reasonable" and "beneficial" use (CVRWQCB 2016d). Water right permits and licenses identify the amounts, conditions, and construction timetables for a proposed diversion. Before issuing the permit, SWRCB must take into account all prior rights and the availability of water in the basin, as well as the flows needed to preserve instream uses such as recreation and fish and wildlife habitat (SWRCB 2016b). Water rights are administered using a seniority system based on the date of applying for the water right—commonly referred to as "first in time, first in right." Junior water rights holders may not divert water in a manner that would reduce the ability of senior water rights holders to exercise their water right.

All surface water used for cannabis cultivation must be associated with a valid water right, whether the cultivator personally holds such a water right or it is held by the water purveyor supplying the cultivation operation (e.g., a municipal water system or a water delivery service).

Water Rights Administration for Cannabis Cultivation

MCRSA and AUMA contain provisions that are directly relevant to SWRCB's water rights permit process. For example, Section 19332(d) of the Business and Professions Code requires that SWRCB, in accordance with Section 13149 of the California Water Code and in consultation with the California Department of Fish and Wildlife (CDFW) and CDFA, shall ensure that individual and cumulative effects of water diversion associated with cultivation of cannabis do not affect the instream flows needed for fish spawning, migration, and rearing or the flows needed to maintain natural flow variability. California Water Code Section 13149 goes on to describe that this is to be accomplished through adoption of principles and guidelines for diversion and use of water for cannabis cultivation in areas where cannabis cultivation may have the potential to substantially affect instream flows. The principles and guidelines adopted may include, but are not limited to, instream flow objectives, limits on diversions, and requirements for screening of diversions and elimination of barriers to fish passage. The principles and guidelines may include requirements that apply to groundwater extraction where SWRCB determines those requirements are reasonably necessary for purposes of this section. SWRCB, CDFW, and CDFA are actively coordinating on the development of draft principles and guidelines, which will be circulated for public review and comment prior to adoption.

Under the MCRSA and AUMA, applicants proposing to divert surface water must possess a valid water right. Specifically, an application for a license issued by CDFA must identify at least one of the following water sources, as specified in Section 8102(b)(24)(A)-(E) of the proposed regulations (provided in **Appendix A**):

(1) Retail water supplier;

(2) Groundwater well;

(3) Rainwater catchment system;

(4) Diversion from a surface water body or underground stream flowing in a known and definite channel; or

(5) Diversion from a surface water body or underground stream flowing in a known and definite channel claiming an exception from the requirement to file a statement of diversion and use.

Section 8109 of the proposed regulations describes the supplemental information requirements for water diversions:

(1) A copy of a registration, permit, or license issued under Part 2 (commencing with Section 1200) of Division 2 of the California Water Code that covers the diversion;

(2) A copy of any statements of diversion and use filed with the SWRCB before July 1, 2017 detailing the water diversion and use;

(3) A copy of a statement of water diversion and use, filed with SWRCB before July 1, 2017, demonstrating that the diversion is authorized under a riparian right and that no diversion occurred between January 1, 2010, and January 1, 2017; or

(4) For a water source where the applicant has claimed an exception from the requirement to file a statement of diversion and use, documentation, submitted to SWRCB, establishing that the diversion is subject to subdivision (a), (c), (d), or (e) of Section 5101 of the California Water Code.

SWRCB issued a notice on May 19, 2017, providing guidance and making available the forms to be filed to meet these requirements (SWRCB 2017b, 2017c).

Sustainable Groundwater Management Act

The Sustainable Groundwater Management Act (SGMA), passed in 2014, became law in 2015, and created a legal and policy framework to manage groundwater sustainably at a local level. The SGMA allows local agencies to customize groundwater sustainability plans to their regional economic and environmental conditions and needs and establish new governance structures, known as groundwater sustainability agencies (GSAs) (State of California 2015). The SGMA requires that a groundwater sustainability plan (GSP) be adopted for groundwater basins designated as high and medium priority (127 out of 515 basins and subbasins) under the California Statewide Groundwater Elevation Monitoring program (described below) by 2020 for basins with critical overdraft of underground

aquifers. GSPs are intended to facilitate the use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results. Undesirable results are defined as the following (State of California 2015):

- Chronic lowering of groundwater levels (not including overdraft during a drought if a basin is otherwise managed);
- Significant and unreasonable reduction of groundwater storage;
- Significant and unreasonable seawater intrusion;
- Significant and unreasonable degraded water quality, including the migration of contaminant plumes that impair water supplies;
- Significant and unreasonable land subsidence that substantially interferes with surface land uses; and
- Depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water.

GSPs are required to include measurable objectives, as well as interim milestones in 5-year increments, to achieve the sustainability goal for the basin for the long-term beneficial uses of groundwater. The GSP may, but is not required to, address undesirable results that occurred before, or had not been corrected prior to the date that the SGMA went into effect. The GSA has the discretion to decide whether to set measurable objectives and the timeframes for achieving any objectives for undesirable results that occurred before 2015. Additionally, GSPs are required to include components related to the monitoring and management of groundwater levels within the basin, mitigation of overdraft, and a description of surface water supply used or available for use for groundwater recharge or in-lieu use.

As with other local regulatory requirements, GSP requirements may apply to licensed cultivators located within the boundaries of a GSA and using groundwater as a source; the source could include on- or off-site wells, as well as supplies from water purveyors or water delivery services that have groundwater as some component of their supply.

California Statewide Groundwater Elevation Monitoring Basin Prioritization

In 2009, the California State Legislature amended the California Water Code with SBx7-6, which mandates a statewide groundwater elevation monitoring program to track seasonal and long-term trends in groundwater elevations in California (California Department of Water Resources [DWR] 2015). Under this amendment, DWR established the California Statewide Groundwater Elevation Monitoring (CASGEM) program, which establishes the framework for regular, systematic, and locally managed monitoring in all of California's groundwater basins (DWR 2015). To facilitate implementation of the CASGEM program and focus limited resources, as required by the California Water Code, DWR ranked all of California's basins by priority: High, Medium, Low, and Very Low. DWR's basin prioritization was based on the following factors (DWR 2015):

1. Population overlying the basin
2. Rate of current and projected growth of the population overlying the basin

3. Number of public supply wells that draw from the basin
4. Total number of wells that draw from the basin
5. Irrigated acreage overlying the basin
6. Degree to which persons overlying the basin rely on groundwater as their primary source of water
7. Any documented impacts on the groundwater within the basin, including overdraft, subsidence, saline intrusion, and other water quality degradation
8. Any other information determined to be relevant by DWR

Local and Regional Laws and Plans

The Porter-Cologne Act created nine RWQCBs in California. The RWQCB boundaries are based on watersheds, and water quality requirements are based on differences in climate, topography, geology, and hydrology for each watershed. Each RWQCB sets standards, issues permits, determines compliance with requirements, and takes enforcement actions to make water quality decisions for its region.

Basin Plans

Each RWQCB must adopt a water quality control plan, or Basin Plan, intended to protect water quality in its region. A Basin Plan is unique to each region and must identify beneficial uses, establish water quality objectives for the reasonable protection of the beneficial uses, and establish a program of implementation for achieving the water quality objectives. Each Basin Plan must conform with the California antidegradation policy (SWRCB 2001). Table 4.8-1 shows several water quality standards from the various Basin Plans that may be applicable to cultivation activities under the Proposed Program.

Table 4.8-1. Selection of Applicable RWQCB Basin Plan Water Quality Standards for Inland Surface Waters

Water Quality Standard	Regional Water Quality Control Board								
	Region 1	Region 2	Region 3	Region 4	Region 5	Region 6	Region 7	Region 8	Region 9
Waters free from coloration that causes nuisance or adversely affects beneficial uses	X	X	X[1]	X	X	X	X	X	X[1]
No impaired tastes/odors	X	X	X	X	X	X	X	X	X
No floating, suspended, or settleable material in concentrations that cause nuisance or adversely affect beneficial uses	X	X	X	X	X	X[2]	X	X	X
No oils/greases/visible film on surface	X	X	X	X	X	X	X	X	X
No alteration of suspended sediment load and discharge rate that causes nuisance or adversely affects beneficial uses	X	X	X		X	X	X		X
No change in turbidity that causes nuisance or adversely affects beneficial uses		X	X	X	X	X	X	X	X
Turbidity shall not be increased more than 20 percent above naturally occurring levels	X								
Dissolved oxygen not below specified threshold[3]	X	X	X	X	X	X	X	X	X

Water Quality Standard	Regional Water Quality Control Board								
	Region 1	Region 2	Region 3	Region 4	Region 5	Region 6	Region 7	Region 8	Region 9
No alteration of natural temperature unless no adverse effect to beneficial uses	X[4]	X[4]	X[4]	X[5]	X[4]	X[4]	X	X[6]	X[7]
No acute/chronic toxicity of substances in waters	X	X	X	X	X	X		X	
Pesticide concentrations shall not adversely affect beneficial uses	X		X	X	X		X		X
Pesticide shall not exceed lowest levels technically, economically feasible					X				
No bioaccumulation of toxins in humans/aquatic life/sediment	X	X	X	X	X	X		X	

Notes: mg/L = milligrams per liter; °F = degrees Fahrenheit.
Beneficial use designations: COLD = Cold Fresh Water Habitat; MAR = Marine Habitat; SAL = Inland Saline Water Habitat; SPWN = Spawning, Reproduction, and/or Early Development; WARM = Warm Fresh Water Habitat

1. In Region 3, coloration attributable to materials of waste origin shall not be greater than 15 units or 10 percent above natural background color, whichever is greater. In Region 9, inland surface waters shall not contain color in concentrations in excess of 20 color units.
2. In Region 6, for natural high-quality waters, the concentration of total suspended materials shall not be altered to the extent that such alterations are discernible at the 10 percent significance level, and the concentration of settleable materials shall not be raised by more than 0.1 milliliter per liter.
3. Minimum dissolved oxygen concentrations where objectives are not otherwise prescribed:
   Region 1: 5.0 mg/L for WARM, MAR, or SAL beneficial uses; 6.0 mg/L for COLD; 7.0 mg/L for (SPWN).
   Region 2: 7.0 mg/L for COLD, 5.0 mg/L for WARM.
   Region 3: 5.0 mg/L for WARM; 7.0 mg/L for COLD, SPWN, or MAR.
   Region 4: 5.0 mg/L for WARM, 6.0 for COLD, 7.0 for waterbodies designated both COLD and SPWN.
   Region 5, Sacramento and San Joaquin River Basin: 5.0 mg/L for WARM, 7.0 mg/L for COLD or SPWN.
   Region 5, Tulare Basin Plan: 5.0 mg/l for WARM, 7.0 mg/L for COLD or SPWN.
   Region 6 (1-day minimum): 3.0 mg/L for WARM, 5.0 mg/L for WARM and SPWN, 4.0 for COLD, 8.0 for COLD and SPWN.
   Region 7: 8.0 mg/L for COLD, 5.0 mg/L for WARM, 8.0 mg/L for WARM and COLD.
   Region 8: 5.0 mg/L for WARM, 6.0 mg/L for COLD.
   Region 9: 5.0 mg/L for MAR or WARM, 6.0 mg/L for COLD.
4. In Regions 1, 2, 3, 5, and 6, natural water temperature may not increase by more than 5°F to waters with COLD or WARM beneficial uses.

5. In Region 4, natural water temperature may not increase by more than 5°F to waters with COLD or WARM beneficial uses; additionally, at no time shall WARM waters be raised above 80°F as a result of waste discharges.
6. In Region 8, the temperature of waters designated COLD shall not be increased by more than 5°F as a result of controllable water quality factors. The temperature of waters designated WARM shall not be raised above 90°F June through October or above 78°F during the rest of the year as a result of controllable water quality factors. Lake temperatures shall not be raised more than 4°F above established normal values as a result of controllable water quality factors.
7. In Region 9, at no time or place shall the temperature of any COLD water be increased more than 5°F above the natural receiving water temperature.

Sources:
Region 1: North Coast Regional Water Quality Control Board 2011
Region 2: San Francisco Bay Regional Water Quality Control Board 2015
Region 3: Central Coast Regional Water Quality Control Board 2016
Region 4: Los Angeles Regional Water Quality Control Board 2016a
Region 5: Central Valley Regional Water Quality Control Board 2016a, 2016b
Region 6: Lahontan Regional Water Quality Control Board 2015
Region 7: Colorado River Basin Regional Water Quality Control Board 2014
Region 8: Santa Ana Regional Water Quality Control Board 2011
Region 9: San Diego Regional Water Quality Control Board 2016a

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Irrigated Lands Regulatory Program

The Irrigated Lands Regulatory Program regulates discharges to prevent agricultural discharges from impairing the waters that receive these discharges. This program is sometimes referred to as agricultural waivers or ag waivers. SWRCB regulates discharges by issuing WDRs or conditional waivers of WDRs (Orders) to growers. Discharges from agricultural lands include irrigation return flow, flows from tile drains, and stormwater runoff. These discharges can affect water quality by transporting sediment, nutrients, pesticides, and other pollutants into surface waters. Many surface waterbodies are impaired due to pollutants from agricultural sources. Additionally, groundwater resources have been contaminated by pesticides, nitrate, and salt (SWRCB 2016a). The WDRs or waivers include requirements such as obtaining education on water quality issues, implementing BMPs that are applicable to the region and size of operations, conducting water quality monitoring, and, when necessary, implementing corrective actions. Many growers have formed coalition groups based on geography and/or crop type to meet these requirements (CVRWQCB 2016c, San Diego [SD] RWQCB 2016b, Colorado River [CR] RWQCB 2015).

To control and assess the effects of discharges from irrigated agricultural lands, the Los Angeles (LA) RWQCB and Central Coast (CC) RWQCB have adopted comprehensive conditional waivers (LARWQCB 2016b, CCRWQCB 2014). The CVRWQCB has issued separate WDRs to eight coalition groups of growers in the Central Valley, and has also issued general WDRs for individual growers (CVRWQCB 2016c). The SDRWQCB has regulated discharges from irrigated lands through a comprehensive conditional waiver, which expired in February 2014. The SDRWQCB is currently developing two separate WDRs to replace the expired waiver, one for growers that are members of a third-party group and one for growers not participating in a third-party group (SDRWQCB 2016b). In the Colorado River Basin, the CRRWQCB issues conditional waivers to individual growers or groups of growers; four conditional waivers for groups of growers have been adopted (CRRWQCB 2014). The NCRWQCB has developed eight separate permits to regulate discharges associated with agricultural lands, based on either the crop type or geographic location; one of these permits is the waiver of WDRs for cannabis cultivation, which is described below. The Santa Ana (SA) RWQCB has adopted a conditional waiver for growers in the San Jacinto River Watershed. The conditional waiver encourages the formation of one or more coalition groups (SARWQCB 2016). The San Francisco Bay (SFB) RWQCB is developing general WDRs for vineyard properties in the Napa River and Sonoma Creek watersheds (SFBRWQCB 2016).

Water Quality Regulation of Cannabis Cultivation

Under MCRSA and AUMA, the RWQCBs are required to address environmental impacts of cannabis cultivation and coordinate, when appropriate, with cities and counties and their law enforcement agencies in enforcement efforts. Additionally, each RWQCB is required to address discharges of waste resulting from cannabis cultivation and associated activities, including the adoption of a general permit establishing WDRs or taking action under waiver provisions described in Section 13269 of the California Water Code.

Two of the state's nine RWQCBs have established regulatory programs addressing cannabis cultivation. On August 13, 2015, the NCRWQCB adopted Order No. R1-2015-0023, Waiver of Waste Discharge Requirements and General Water Quality Certification, establishing enforceable requirements that apply to cannabis cultivation operations larger than

specified size thresholds (NCRWQCB 2015). On October 2, 2015, the CVRWQCB adopted Order No. R5-2015-0113, Waste Discharge Requirements General Order for Discharges of Waste Associated with Medicinal Cannabis Cultivation Activities, establishing enforceable requirements that apply to cultivation operations larger than a specified size threshold (CVRWQCB 2015a). These two regulatory programs are described in more detail below.

North Coast RWQCB

NCRWQCB Order No. R1-2015-0023 (NCRWQCB 2015) applies to the cultivation of cannabis on private land that results in a discharge of waste[1] to an area that could affect waters of the State (including surface water and groundwater). Cannabis cultivation activities at a given site fall within one of three tiers (Tier 1, Tier 2, and Tier 3, as described below), depending on the nature of the operation and risk to water quality. Order No. R1-2015-0023 does not apply to any parcel with a cumulative area of cannabis cultivation or operations with similar environmental effects of less than 2,000 square feet where there is no potential for discharge of waste. Properties with site characteristics or development that have impacts that cannot be ultimately mitigated to less-than-significant levels require regulation under a separate and individual order. Order No. R1-2015-0023 addresses discharges and related controllable water quality factors from a range of activities, such as maintenance, activities within and adjacent to wetlands, water diversion, and waste disposal.

Low-risk (Tier 1) sites have a slope of 35 percent or less; a combined total area of cannabis cultivation of 5,000 square feet or less; no cultivation areas or associated facilities located within 200 feet of a surface waterbody; and no direct diversion of surface water from May 15 through October 31. Tier 1 dischargers must adhere to standard conditions in the order and self-certify that all requirements are met.

Moderate-risk (Tier 2) sites have an area of less than 10,000 square feet; a fully implemented water resource protection plan; and determination by NCRWQCB staff or an approved third party to pose a low threat to water quality, based on full compliance with the order's standard conditions.

High-risk (Tier 3) sites require cleanup, restoration, and/or remediation based on current or past land development/management activities that have resulted in a discharge or threatened discharge in violation of water quality standards. Such conditions may include, but are not limited to, filled watercourses or wetlands, perched fill, steep cut slopes, roads, or fill prisms that cannot be stabilized sufficiently to prevent erosion and sediment delivery to surface waters (either on or off site). Tier 3 dischargers must develop and implement a cleanup and restoration plan, as detailed in the order, and comply with the order's standard conditions.

[1] NCRWQCB Order No. R1-2015-0023 specifically prohibits the placement or disposal of earthen materials, soil, silt, plant waste, slash, or other organic, or inorganic refuse, rubbish, and solid waste, bio-stimulatory substances and/or water containing elevated temperatures above background conditions, and/or chemicals, such as but not limited to pesticides, fertilizers, or other substances into any stream or watercourse.

Enrollment, an annual fee, and annual reporting are required for dischargers on all tiers, and all dischargers are subject to civil penalties and other formal enforcement actions if the applicable requirements are not met.

Central Valley RWQCB

CVRWQCB Order No. R5-2015-0113 (CVRWQCB 2015a) applies to cannabis cultivation sites on which cultivation activities occupy and/or disturb more than 1,000 square feet. Cannabis cultivation activities at a given site fall within one of three tiers based on threat to water quality (Tier 1, Tier 2, and Tier 3), as determined by specific physical characteristics of the operation and its surroundings. Order No. R5-2015-0113 establishes the conditions under which discharges from sites may be allowed.

Low-risk (Tier 1) sites have a slope of 30 percent or less; cultivation activities that occupy and/or disturb less than 0.25 acre (10,890 square feet) of the parcel; and no cultivation activities or associated facilities located within 200 feet of a wetland or a Class I or II watercourse.[2] Tier 1 dischargers must maintain on site a copy of the CVRWQCB's *Cannabis Cultivation BMPs Manual*, which was issued as Attachment A of the order (CVRWQCB 2015b).

Moderate-risk (Tier 2) sites have a slope of no more than 30 percent; cultivation activities that occupy and/or disturb less than 1 acre and no more than 50 percent of the parcel(s); and no cultivation activities or associated facilities located within 200 feet of a wetland or a Class I or II watercourse. Tier 2 dischargers must maintain on site a copy of the CVRWQCB's *Cannabis Cultivation BMPs Manual*; conduct a pre-winter inspection and a post-winter Effectiveness Monitoring Inspection; and submit an annual monitoring report.

Elevated-risk (Tier 3) sites have a slope greater than 30 percent; cultivation activities that occupy and/or disturb more than 1 acre or more than 50 percent of the parcel(s); or cultivation activities or associated facilities located within 200 feet of a wetland or a Class I or II watercourse. Tier 3 dischargers must maintain on site a copy of the CVRWQCB's *Cannabis Cultivation BMPs Manual*; conduct a pre-winter inspection and a

[2] Watercourse classes are provided in 14 CCR Section 916.5 as follows:

Water Class	Water Class Characteristics or Key Indicator Beneficial Use
Class I	▪ Domestic supplies on site and/or within 100 feet downstream of the operations area and/or ▪ Fish always or seasonally present onsite includes habitat to sustain fish migration and spawning
Class II	▪ Fish always or seasonally present offsite within 1,000 feet downstream and/or ▪ Aquatic habitat for non-fish aquatic species. ▪ Excludes Class II waters that are tributary to Class I waters.
Class III	▪ No aquatic life present, watercourse showing evidence of being capable of sediment transport downstream to waters Class I or II waters under normal high-water flow conditions after completion of timber operations.
Class IV	▪ Man-made watercourses, usually downstream established domestic, agricultural, hydro-electric supply, or other beneficial use.

post-winter Effectiveness Monitoring Inspection; submit an annual monitoring report; and develop and submit for CVRWQCB approval a site management plan describing practices to be implemented on site to minimize impacts on surface water and groundwater.

All dischargers are subject to civil penalties and other formal enforcement actions if the applicable requirements are not met.

4.8.3 Environmental Setting

The following discussion describes regional hydrology, water quality, and environmental toxicology conditions with relevance to the Proposed Program.

Regional Hydrology

DWR divides California into 10 hydrologic basins. The California Water Code defines nine basins; however, the Lahontan region is divided in two. The boundaries of the basins are major river watersheds, as defined by Section 13200 of the California Water Code. A brief description of each region, as taken from Volume 2 of the *California Water Plan Update 2013* (DWR 2013), is provided below.

North Coast Hydrologic Region

The North Coast Hydrologic Region spans approximately 12.46 million acres, encompassing all or parts of Modoc, Siskiyou, Del Norte, Trinity, Humboldt, Mendocino, Lake, and Sonoma Counties. Some small portions of other counties also are included within this region. The region extends from the Oregon border south to Tomales Bay and from the Coast Ranges to the Mad River. Most of the region is sparsely populated because of the rugged terrain and high degree of forestation. Precipitation in the region varies drastically, from up to 120 inches annually in the Smith River Watershed to 10 inches in portions of the Klamath River Watershed. The primary water quality issues in the region relate to erosion and runoff from urbanized areas, logging, and agricultural operations. The need to manage erosion and runoff from these land uses is reflected in the prevalence of sediment, temperature, and nutrients as impairing pollutants in the NCRWQCB's Section 303(d) list of impaired waterbodies. A total of 63 alluvial groundwater basins and subbasins underlie approximately 1.022 million acres of the region (DWR 2013).

San Francisco Bay Area Hydrologic Region

The San Francisco Bay Area Hydrologic Region spans approximately 2.88 million acres, encompassing all of San Francisco County and parts of Marin, Sonoma, Napa, Solano, San Mateo, Santa Clara, Contra Costa, and Alameda Counties. This relatively small region has 6.3 million people, the second largest population of any hydrologic region in the state. A total of 33 alluvial groundwater basins and subbasins underlie approximately 896,000 acres of the region. Groundwater is used for approximately 21 percent of the region's water supply demands (DWR 2013).

Precipitation is mostly rainfall, with insignificant snowfall. Average annual precipitation is 28 inches but ranges widely, with some higher elevations in the region averaging more than 40 inches of precipitation annually and some areas in the South Bay averaging 15-20 inches annually. Runoff characteristics include high peak discharges because of small, steep

watersheds. Local rivers are susceptible to severe flooding during high rainfall events. Some watersheds produce high sediment yields caused by unstable rock types/soils. The primary water quality concerns in the region are legacy pollutants such as mercury and polychlorinated biphenyl compounds (PCBs); emerging toxic pollutants such as flame retardants and pharmaceuticals; and other pollutants from urban and rural runoff, including pathogens, nutrients, and sediment (DWR 2013).

Central Coast Hydrologic Region

The Central Coast Hydrologic Region spans approximately 7.22 million acres, encompassing all of Santa Cruz, Monterey, San Luis Obispo, and Santa Barbara Counties; most of San Benito County; and parts of San Mateo, Santa Clara, and Ventura Counties. This region generally is not heavily populated. Water quality issues such as nitrate and pesticide contamination stem from agricultural use in the Salinas Valley. A total of 60 alluvial groundwater basins and subbasins underlie approximately 2.390 million acres of the region. Groundwater is heavily used to meet agricultural and urban water supply demands in the region (DWR 2013).

West of the Coast Ranges, the climate of the region is dominated by the Pacific Ocean and is characterized by small daily and seasonal temperature changes and high relative humidity. As distance from the ocean increases, the maritime influence decreases, resulting in a more continental type of climate that generates warmer summers, colder winters, greater daily and seasonal temperature fluctuations, and lower relative humidity. Between 2008 and 2012, the average annual precipitation (usually rain) in the region ranged from about 11 to 36 inches. Most of the rain occurs between late November and mid-April, with the mountain areas receiving more rainfall than the valley floors (DWR 2013).

South Coast Hydrologic Region

The South Coast Hydrologic Region spans approximately 6.78 million acres. The region extends from the Pacific Ocean inland to the San Jacinto Mountains and Peninsula Range. The region extends from the international Mexico–U.S. border, which marks the southernmost boundary, to the crest of the Transverse Ranges on the north. Half of the population of California lives in this region, placing a high demand on water, half of which is fulfilled by outside sources. The relatively large number of residents has resulted in water quality issues related to wastewater, urban runoff, industrial discharges, and agricultural chemical usage. The hydrologic region is separated into three subregions, each under the jurisdiction of separate RWQCBs: Los Angeles, Santa Ana, and San Diego (DWR 2013).

The South Coast Hydrologic Region has a Mediterranean climate with mostly dry years, interrupted by infrequent high-precipitation years. It is generally characterized by warm, dry summers and mild, wet winters, although it also can experience intense subtropical storms. Precipitation generally is rainfall, with insignificant snowfall. Average annual precipitation for the region is 17.2 inches. The eastern and southern portions of the region can be affected in the late summer by monsoonal thunderstorms. Rivers and streams are largely ephemeral and fed by rainfall. Recurrent flooding is a problem in many places in the region. Sedimentation and erosion occur in many watersheds due to intense urbanization. Debris flows and mudflows occur in some drainages (DWR 2013).

Sacramento River Hydrologic Region

The Sacramento River Hydrologic Region spans approximately 17.4 million acres, encompassing all or large parts of Modoc, Siskiyou, Lassen, Shasta, Tehama, Glenn, Plumas, Butte, Colusa, Sutter, Yuba, Sierra, Nevada, Placer, Sacramento, El Dorado, Yolo, Lake, and Napa Counties. The region covers the Sacramento Valley and extends from the Cascade Range at the Oregon border to the Sacramento–San Joaquin Delta. Most of the region is rural rather than urban. A number of different climate types are found in the region. In the north is a high desert plateau that experiences cold, snowy winters with moderate precipitation and hot, dry summers. Cold, wet winters with greater precipitation occur in the northern and eastern mountainous areas. The average annual precipitation for the region is 37.9 inches. The Sacramento Valley has mild winters with moderate precipitation and hot, dry summers. Surface water from this area provides water for many urban and agricultural areas in California. Water in the region is generally of high quality; however, there is increasing attention to issues regarding the salinity of surface water and the subsequent salt loading that occurs for south-of-Delta exporters. Primary water quality concerns are increased salinity, pesticide impairments from agricultural activities, legacy mining impacts, and sedimentation and erosion (DWR 2013).

San Joaquin River Hydrologic Region

The San Joaquin River Hydrologic Region spans approximately 9.7 million acres, encompassing all of Calaveras, Tuolumne, Mariposa, Madera, San Joaquin, and Stanislaus Counties; most of Merced and Amador Counties; and parts of Alpine, Fresno, Alameda, Contra Costa, Sacramento, El Dorado, and San Benito Counties. Annual precipitation in the region generally increases from south to north and from west to east. This region experiences a wide range of precipitation that varies from low rainfall amounts on the valley floor to extensive snowfall in the higher elevations of the Sierra Nevada mountains. The snow that remains after winter serves as stored water before it melts in the spring and summer. The average annual precipitation for the region is 27.1 inches, although the average annual precipitation of several Sierra Nevada stations is about 35 inches. The snow and rain that fall in this region contribute to the water supply for the entire state. The primary water quality concerns are increasing salinity in the Central Valley, boron impairment of the lower San Joaquin River, pesticide impairments from agricultural activities, legacy mining impacts, and sedimentation and erosion (DWR 2013).

Tulare Lake Hydrologic Region

The Tulare Lake Hydrologic Region spans approximately 10.9 million acres and includes all of Kings and Tulare Counties and most of Fresno and Kern Counties. The Tulare Lake Hydrologic Region had 2.27 million people in 2010. About 6 percent of the state's total population lives in this region, and 71 percent of the region's population lives in incorporated cities. The mean annual precipitation in the valley portion of the region ranges from about 6 to 11 inches, with 67 percent falling from December through March and 95 percent falling from October through April. A total of 12 groundwater basins and 7 subbasins underlie approximately 5.33 million acres of the region. Groundwater is used extensively for agricultural production and urban use, which has led to the use of groundwater recharge programs near major urban areas. Human activities, including agricultural practices, have resulted in contamination of groundwater in the region with pesticides, nitrates, metals, and high levels of salinity. Arsenic contamination in the region is generally considered to be the result of naturally occurring arsenic. The primary surface

water quality issues for the region are salinity, pesticides, metals, and erosion and sedimentation (DWR 2013).

North Lahontan Hydrologic Region

The North Lahontan Hydrologic Region spans approximately 3.91 million acres, encompassing portions of Modoc, Lassen, Sierra, Nevada, Placer, El Dorado, Alpine, Mono, and Tuolumne Counties. The region is bounded by the Sierra Nevada on the west and extends from the Oregon border on the north nearly to Mono Lake on the south. The area is sparsely populated. Precipitation is generally greater in the high mountain regions and lower in the low valleys. Average annual precipitation ranges from more than 60 inches in the Sierra Nevada, in the upper reaches of the Truckee, Carson, and Walker River basins, to less than 5 inches in the valleys of eastern Modoc and Lassen Counties. Depending on precipitation each year, groundwater provides about 30-35 percent of the water supply, with the bulk of water supply provided by surface water. Overall water quality is high in the region, with a few local water quality issues. The primary concern in the Lake Tahoe portion of the region is the levels of sediment and nutrients that enter Lake Tahoe and the effect they have on the lake's clarity. Other streams are impaired by various pollutants, from metals in mining districts to pathogens in areas where grazing takes place. In some areas, groundwater is contaminated by nitrates or methyl-tertiary butyl ether (MTBE) (DWR 2013).

South Lahontan Hydrologic Region

The South Lahontan Hydrologic Region spans approximately 21.2 million acres in eastern California. The region extends from Mono Lake to the crest of the San Gabriel and San Bernardino Mountains and is bounded by the Sierra Nevada mountains in the west. The region is sparsely populated. Average annual precipitation is approximately 8 inches per year. Rights to a large portion of Sierra Nevada snowmelt water are owned by the Los Angeles Department of Water and Power. Water quality in this region generally is good, with a few local water quality issues. Surface water quality is affected by hydromodification (including sedimentation, erosion, and loss of riparian areas), as well as increased soil loss and deposition associated with land disturbance from development. Groundwater quality is affected by elevated concentrations of nitrates, total dissolved solids, elevated mineral concentrations due to overdraft, and, in some areas, metals and dissolved industrial salts (DWR 2013).

Colorado River Hydrologic Region

The Colorado River Hydrologic Region spans approximately 13 million acres in southeastern California, encompassing all of Imperial, most of Riverside, and parts of San Bernardino and San Diego Counties. The region extends north from the Mexico–U.S. border to the Ord Mountain range, bounded by the Arizona and Nevada state borders to the east and the San Bernardino Mountains to the west. The region has about 2 percent of the state's total population, with the majority living in incorporated cities. The climate is arid, averaging only 5.5 inches of precipitation a year. Surface water quality concerns include elevated silt and pathogen concentrations, nitrates, and impacts from animal feeding and dairy operations. Groundwater quality issues in this region include high salinity, arsenic (a naturally occurring contaminant), and failing septic systems (DWR 2013).

Water Quality

The quality of surface water and groundwater varies greatly throughout California, based on the natural setting and types of human activity. Potential sources of water quality impairment can come from both point and nonpoint sources. Point sources emit from discrete locations, such as an industrial center, pipe, or concentrated animal feeding operation. In comparison, non-point sources are not easily identifiable locations and include such sources as runoff from roads and driveways, discharges from improperly managed construction sites, crop and forest land, mining operations, and faulty septic systems. Nonpoint sources also include agricultural stormwater discharges and return flows from irrigated agriculture. Pollution constituents can range from sediment to pesticides and fertilizers. During rainfall or snowmelt, these pollutants can be carried to lakes, rivers, wetlands, coastal water, and groundwater. The effects of nonpoint-source pollutants on specific waters vary and may not always be fully assessed; however, states report that nonpoint-source pollution is the leading remaining cause of water quality problems (USEPA 2016d). Cannabis cultivation may involve nonpoint-source discharges, such as runoff from roadways and agricultural stormwater discharges and return flows, containing contaminants such as sediment, pesticides, fertilizers, petroleum hydrocarbons, and heavy metals.

Erosion and sedimentation are two processes that can affect water quality. Erosion is the detachment and movement of soil particles by natural forces, primarily water (rain events) and wind. Sedimentation is the process in which particulate matter is carried from its point of origin by either natural or human-enhanced processes and is deposited elsewhere on land surfaces or in water bodies. Sediment is a natural product of erosion; however, the natural sediment load may be increased by factors such as human practices, unvegetated streambanks, and areas of uncovered soil. Agriculture (including cannabis cultivation) can be a large source of sediment load increase; however, with appropriate management practices, this can be minimized.

Surface waters, such as rivers and streams, may be affected by a large variety of pollutants, including sediments, pathogens, pesticides, trace metals, and legacy contaminants (pollutants that have been banned or replaced and are no longer supplied to the environment in large quantities, but that remain in the environment for an extended period after deposition with little degradation), such as dichlorodiphenyltrichloroethane (DDT) and other chlorinated hydrocarbon pesticides, and PCBs.

Primary agricultural areas occur in fertile valleys throughout California, including Salinas, Sacramento, and the San Joaquin and Imperial Valleys, although cannabis cultivation typically occurs more frequently within mountainous and forested regions of the state such as the Coast Ranges and Sierra Nevada foothills. Various chemicals, such as fertilizers and pesticides, are used to maintain agricultural production, ensure public health and safety, and provide pest control. Irresponsible use of these chemicals can lead to runoff into surface waters, which is widely acknowledged to adversely affect aquatic organisms and human health.

Monitoring Studies

Various local, state, and federal agencies in California monitor water quality and develop guidelines and programs to provide environmental and public safety. These are relevant to

the Proposed Program because they provide baseline information regarding water quality constituents from all sources of discharge, including baseline cannabis cultivation activities that may be affected by the Proposed Program. No quantitative water quality studies focused specifically on cannabis cultivation were identified as part of the literature review for this PEIR.

Surface Water Ambient Monitoring Program

In 1999, SWRCB developed a program, known as the Surface Water Ambient Monitoring Program (SWAMP), to coordinate all water quality monitoring within California. Statewide monitoring activities are conducted for bioaccumulation in fish, bioassessment of the health of streams and rivers, and stream pollution trends (SPoT); these activities determine trends in sediment toxicity and contaminant concentrations. RWQCBs conduct monitoring programs to address region-specific water quality concerns. SWAMP conducts special studies to investigate water quality concerns not addressed by other statewide or regional monitoring programs.

An evaluation of SPoT monitoring activities between 2001 and 2010 was summarized in the 2010 report *Toxicity in California Waters*, indicating the trends in chemical contamination and toxicity in the context of watershed land uses (Anderson et al. 2010). In monitoring conducted during that period, more than 50 percent of freshwater collection sites showed some degree of toxicity (in fresh water and freshwater sediment samples), and more than 45 percent of the marine sites showed some degree of toxicity (in marine sediment samples). Statewide toxicity trends were evaluated between 2008 and 2012 and the results were presented in the report *Trends in Chemical Contamination, Toxicity and Land Use in California Watershed* (Phillips et al. 2014). This report summarized results from the first 5 years of annual SPoT surveys, which assessed large watersheds across California to determine how stream pollutant concentrations were affected by land use, with an emphasis on urban and agricultural development. The incidence of toxicity remained relatively stable over those 5 years, with a substantial amount of toxicity seen in approximately 19 percent of the sediment samples. Approximately 8 percent of the samples were identified as highly toxic. Highly toxic samples were collected from agricultural watersheds in the Central Valley, the Central Coast, and urban areas of southern California. Agricultural and urban sites showed greater water and sediment toxicity than sites in less developed areas. The study noted no substantial upward or downward trends in toxicity at urban or agricultural sites. Most toxic and highly toxic sites were located in urban areas.

Correlation analyses and toxicity identification evaluations reveal significant correlation between reduced survival rates of invertebrate test species and contaminant concentrations, particularly pyrethroid insecticides (e.g., permethrin, bifenthrin, fenpropathrin, tau-fluvalinate, and lambda-cyhalothrin). These analyses also found a correlation between reduced survival rates of invertebrates and increased stream sedimentation. These statistical relationships provide a basis for developing hypotheses to assess causal relationships. For example, a key question concerns the degree to which pyrethroids and other pesticides are affecting stream macroinvertebrates in California watersheds.

Because of the detection of pyrethroid insecticides in urban waterways at levels toxic to some small aquatic organisms, in 2012, CDPR implemented new restrictions on the use of pyrethroid insecticides in urban applications (CDPR 2012). The SPoT program is

collaborating with CDPR to determine if use restrictions and outreach to professional pesticide applicators have reduced sediment-associated pyrethroids in urban watersheds (Phillips et al. 2014). Note that there are no pyrethroid insecticides labelled for use on cannabis at this time.

Groundwater and Surface Water Protection Programs

In addition to the previously described Surface Water Protection Program, CDPR operates a Groundwater Protection Program. The Groundwater Protection List identifies seven herbicides that have been detected in groundwater or soil: atrazine, simazine, bromacil, diuron, prometon, bentazon, and norflurazon. In addition to these detected herbicides, the list contains approximately 100 identified chemicals that have the ability to pollute groundwater (CDPR 2013b). None of these detected herbicides or identified chemicals would be expected to be authorized for use on cannabis cultivation licensed under the Proposed Program, although some may be used at unpermitted sites (see Appendix F).

CDPR is required to produce an annual well sampling report that combines information from multiple public agencies into a single database. Table 4.8-2 summarizes results from the 2014-2016 annual reports, addressing information collected in 2013-2015. The number of sampled pesticides in each annual report ranged from 123 to 134. The number of wells for which samples were reported ranged from 3,116 to 6,023. The number of wells in which pesticides were detected ranged from 298 to 365.

Table 4.8-2. Statewide Pesticide Monitoring, 2013-2015

Data Collected	2013	2014	2015
Pesticides sampled	123	133	134
Pesticides detected	23	21	21
Wells sampled	3,116	6,023	4,003
Wells with detections	298	432	365
Counties sampled	55	57	56
Counties with detections	18	22	17

Sources: CDPR 2015b, 2016a, and 2016b

In 2015, monitoring of ambient surface water quality was conducted in seven watersheds within agricultural areas in the counties of Imperial, Monterey, Riverside, San Luis Obispo, and Santa Barbara. The study tested for 30 pesticides, of which 21 were detected. The insecticides detected with the greatest frequencies were imidacloprid, methomyl, methoxyfenozide, and bifenthrin; detection frequencies ranged from 81 percent (imidacloprid) to 53 percent (bifenthrin) of the samples analyzed for each pesticide. The herbicides with the greatest detection frequencies were bensulide (frequency of 60 percent) and atrazine (50 percent) (Deng 2016).

Other Surface Water and Groundwater Monitoring

CDPR and SWRCB maintain comprehensive databases of pesticides in surface water and groundwater (CDPR 2016c, 2016d; SWRCB 2016d, 2016e). These databases draw data from a variety of sources, including federal, state, and local agencies; private industry; and environmental groups. These sources include USEPA, SWRCB, CDPR, and the California

Department of Public Health (CDPR 2016e). The databases do not include the monitoring of pesticide ingredients that are expected to be authorized for use in cannabis cultivation operations licensed under the Proposed Program (see Appendix F), although as with the list above, some of the pesticides found in the databased may be used at unpermitted sites.

Integrated Section 303(d) and 305(b) Report

Because of the accumulation and/or persistence of certain chemicals or conditions in natural waterways, the affected watersheds and tributaries have been listed as impaired for those chemicals or conditions. The impairments indicate that those water bodies have no further assimilative capacity for the listed chemicals, and any discharges would further impair conditions. The listing also indicates that the water bodies cannot adequately meet goals set by the applicable RWQCB, USEPA, or other regulatory agencies for the purpose of protecting beneficial uses.

The SWRCB's *2012 California Integrated Report* for Sections 303(d) and 305(b) of the CWA reported 3,584 impaired waterbody listings throughout California (SWRCB 2015), covering approximately 190 hydrologic areas, more than 211,000 miles of rivers and streams, more than 10,000 lakes spanning 1.6 million acres, more than 600,000 acres of bays and estuaries, and a coastline stretching more than 1,000 miles. The report included 92 new listing and 14 delistings since the previous 303(d) listings in 2010. The new listings primarily resulted from water quality data collected by internal programs and provided by outside agencies and entities (SWRCB 2015). The 303(d) list still may underrepresent the total number of impaired water bodies in California because of a lack of data, particularly for rural or remote areas with no active data collection program. A variety of pollutant types may necessitate adding a water body to the 303(d) list, including metals (in particular, mercury), nutrients, sediments, and pesticides, including pollutants that may be generated by cannabis cultivation.

Water Demand for Cannabis Cultivation

Based on the literature found during preparation of this PEIR, water demand for cannabis cultivation has the potential to divert substantial amounts of streamflow in the watersheds where operations are located. A study conducted by Bauer et al. (2015) evaluated the impacts of water diversions resulting from cultivation sites at a watershed scale, by interpreting high-resolution aerial imagery, to estimate the number of cannabis plants being cultivated in four watersheds in northwestern California. Estimates were made of the water demand for cannabis irrigation and the potential effects that water diversions could have on streamflow in the watersheds studied. The results indicated that the cultivation of cannabis could result in the diversion of substantial amounts of streamflow from the study watersheds, with an estimated flow reduction of up to 23 percent of the annual 7-day low flow in the least affected watersheds. Estimates from the other study watersheds indicated that water demand for cannabis cultivation exceeds streamflow during the low-flow period.

Reduced streamflows can adversely affect water quality parameters through trends such as increased temperature, reduced dissolved oxygen, creation of nuisance aquatic plant growth, and increased turbidity, particularly during the drier portion of the year, which coincide with the period of peak irrigation need. Bauer et al. (2015) concluded that, in the most affected study watersheds, diminished streamflow is likely to have lethal or sub-lethal effects on state-listed and federally listed salmon and steelhead trout and to cause further

decline of sensitive amphibian species. Independent of the effects of cannabis cultivation, water scarcity and resulting habitat degradation are anticipated to worsen because future hydrologic scenarios anticipate less water due to climate change (CDFW 2015).

4.8.4 Impact Analysis

Methodology

Potential impacts on water quality were evaluated by comparing baseline conditions to the conditions that may result from implementation of Proposed Program activities. As described in Section 4.0, *Introduction to the Environmental Analysis,* the PEIR considers ongoing cannabis cultivation activities, including those that are unpermitted, to be part of the baseline condition. Therefore, to the extent that current cannabis cultivation activities are adversely affecting waters, these impacts would be considered as part of the environmental baseline, to which the Proposed Program's potential impacts would be compared. That said, while cannabis cultivation activities are ongoing in many areas of California, if cultivation were to occur in an entirely new location under the Proposed Program, it could result in new impacts in that area.

Potential impacts were assessed qualitatively, depending on the activity, based on available information and the degree to which the Proposed Program could result in violations of water quality standards, impairment of beneficial uses, or water quality conditions that could be harmful to aquatic life or human health. The analysis also considers potential effects on hydrology, groundwater, and water supply, using the significance criteria described below.

Fate and Transport of Chemicals

Besides the amount of chemical that is applied to a plant or soil, the impact of chemicals on water quality depends on the fate and transport mechanisms of a particular chemical. When evaluating Proposed Program activities that would use pesticides containing various chemicals, the first step in assessing their impact is to determine whether a potential exists for any chemical to reach surface water or infiltrate to groundwater. This would be governed by both the location of a given water body with respect to the activity and the fate and transport properties of the particular chemical(s), namely, how the chemical(s) would move through different environmental media such as air, soil, and water, and how they may degrade during transport.

The relevant transport processes for Proposed Program activities include the following:

- Aerial drift to water body
- Movement from plant foliage to water or soil
- Movement through soil to water body via either of two mechanisms:
  - Adsorption to soil particles reaching water through erosion or sedimentation
  - Direct transport from water flowing through soil

In addition to the mechanism of transport, the environmental fate of a chemical also is important. Environmental fates are processes related to the breakdown, inactivation, or environmental availability and persistence of a chemical in the environment. Key types of fate of chemicals include the following:

- Absorption/adsorption: processes by which a chemical becomes associated with a surface of a particle such as soil or plant matter
- Biodegradation: a process by which microbial organisms transform (through metabolic or enzymatic action) the structure of chemicals introduced into the environment
- Hydrolysis: the breakdown of a chemical resulting from reaction with water
- Photolysis (also known as photodegradation): the breakdown of a chemical caused by exposure to light
- Solubilization: a process by which a chemical is dissolved in water
- Volatilization: the conversion of a chemical substance from a liquid to a gaseous or vapor state

Depending on the specific chemical, these environmental fate processes occur at different rates. Furthermore, some of these processes occur in environmental media, such as in soil or plant matter, before reaching water. The impact of fate and transport processes can mean that a chemical that could have toxic effects if directly exposed may be transformed and not have such effects if and when its degradate or metabolite reaches water.

As described in Appendix F, pesticides that are currently not prohibited from use do not pose a risk to water quality when used according to label directions.

Types of Water Quality Standards

Water quality standards can be divided into two types: narrative and numerical. Narrative standards provide general descriptions of water quality goals but do not specify quantitative measures of achievement of these standards. In contrast, numerical thresholds provide a specific measurable value, such as a concentration in water, that determines whether the water quality goal is achieved. Both types of standards are discussed in detail below.

Narrative Standards

Narrative standards provide a general description of water quality goals without specifying a specific quantitative value to define the standard. These are typically established by RWQCBs in Basin Plans. Table 4.8-1 lists several types of narrative standards.

Discharges of water from Proposed Program activities could be subject to narrative water quality standards related to water coloration, taste, or odor. The potential for substantial adverse effects would be a function of the volume of stormwater or agricultural return flows being discharged, compared to the volume in the receiving water. In the case of stormwater, typically there would be substantial dilution of potential contaminants; in contrast, irrigation return flows may be small but could be one of the only sources of flow in small streams during the dry season. Some of the chemicals used in cannabis cultivation contain various oils that, if they reach water, may cause a visible film on the water surface; however, this would be unlikely because the requirements of SWRCB and RWQCB permits

include measures to minimize potential for discharge of pesticides or other substances to water bodies. Cultivators would be required to control all wastes appropriately by following applicable regulations and appropriate waste disposal protocols. As a result, most narrative standards are excluded from further analysis. Where numerical taste and odor standards exist, these were used to determine whether Proposed Program activities could cause potentially significant impacts.

The narrative standards related to toxicity (acute and chronic) and bioaccumulation are described in more detail below.

Numerical Thresholds

Numerical thresholds have been developed by various agencies to meet human health, ecological, and other water quality goals. Several sources were reviewed for numerical standards of pollutants, including SWRCB's Compilation of Water Quality Goals, RWQCB Basin Plans, and TMDLs (SWRCB 2016f). The numerical standards addressed in this analysis focus on freshwater standards because the likelihood of saline water bodies being directly affected is low and any discharges to saline water bodies would be subject to substantial dilution that would greatly decrease any potential chemical concentrations.

Some pollutants have multiple applicable numerical standards. For the purposes of this analysis, the most stringent applicable standard (i.e., lowest concentration) was used to evaluate the potential to exceed water quality standards. In the case of TMDL standards, they would only apply to the impaired water body for which the standard was developed.

Other Considerations and Assumptions Used in the Analysis

Cannabis cultivators under the Proposed Program would need to comply with the environmental protection measures listed in Section 8313(f) of the proposed regulations, including the following:

- Comply with all pesticide label directions.
- Store chemicals in a secure building or shed to prevent access by wildlife.
- Contain any chemical leaks and immediately clean up any spills.
- Apply the minimum amount of product necessary to control the target pest.
- Prevent off-site drift.
- Do not spray directly to surface water or allow pesticide product to drift to surface water. Spray only when wind is blowing away from surface water bodies.
- Do not apply pesticides when they may reach surface water or groundwater.

In many cases, applications would occur indoors or in nursery or greenhouse residential settings, with setbacks from surface water and aquatic organisms. For instance, many nurseries are contained in semi-isolated areas, with setbacks/buffers that would attenuate the concentrations of the chemicals during and after applications. This typically would

occur either through adsorption into soils or by containing runoff water in a storm drainage system.

Consideration of Impaired Water Bodies

Runoff from cannabis cultivation sites could include all categories of contaminants for which water bodies are listed as impaired on the State's Section 303(d) list of impaired waterbodies (see Table 4.8-3). These contaminants include pathogens, pesticides, unidentified toxicity, nutrients, sediment, and turbidity (Carah et al. 2015). In some cases, the listed impairment is for a specific contaminant (e.g., a particular pesticide) that would not be found in runoff from a cultivation site (e.g., if the pesticide is prohibited from use in cultivation). Also of note are the water bodies listed for unknown toxicity, which is often linked to human-made chemicals. The potential for discharge to impaired water bodies is considered as part of the cumulative impact analysis (discussed in Chapter 6, *Cumulative Considerations*) because any incremental discharge to such water bodies (even if minor) could contribute to their cumulative impairment.

Table 4.8-3. Number of Impaired Water Bodies and Causes of Impairment

Identified Causes of Impairment	Number of Impaired Water Bodies*
Pathogens	536
Pesticides	442
Unidentified Toxicity	118
Nutrients	176
Sediment	75
Turbidity	49

* A listed water body may be impaired due to multiple causes; as a result, this table counts some water bodies multiple times.

Source: USEPA 2016e

Significance Criteria

For the purposes of this analysis, based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines, the Proposed Program would result in a significant impact related to hydrology and water quality if it would:

A. Violate any water quality standards or waste discharge requirements, or otherwise substantially degrade water quality;

B. Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted);

C. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on or off site, or substantially increase the

rate or amount of surface runoff in a manner that would result in flooding on or off site;

D. Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage system or provide substantial additional sources of polluted runoff;

E. Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map;

F. Place within a 100-year flood hazard area structures that would impede or redirect flood flows;

G. Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam, or inundation by seiche, tsunami, or mudflow; or

H. Have insufficient water supplies available to serve the project from existing entitlements and resources, requiring new or expanded entitlements.

Each impact criterion has been assigned an alphabetical code, as designated in the list above. Direct and indirect impacts under each applicable impact criterion are analyzed next.

Note that several of the impact criteria do not apply directly to the Proposed Program because the Proposed Program is focused on cannabis cultivation activities, and CDFA would not oversee or authorize new development or modification of facilities used for cultivation, including activities such as site grading, construction of roads, stream crossings, buildings and other structures, each of which would be subject to local permitting and environmental review as applicable. Specifically:

- With respect to Criterion B, cultivation activities under the Proposed Program would have low potential to substantially interfere with groundwater recharge, because the acreage restrictions established in the regulations would limit the amount of impervious surface that could be added as a result of any new cultivation operation.
- With respect to Criteria C and D, cultivation activities would not alter any drainage patterns or substantially increase the rate or amount of surface water use because of compliance with local laws and regulations, including NPDES requirements. In general, return flows from irrigation would be minimal; therefore, while they are considered for their potential to contain water quality contaminants, issues related to hydrology, flooding, and the capacity of stormwater systems are not considered further.
- With respect to Criteria E, F, and G, the Proposed Program would not involve construction of housing or other structures that could be located in a floodplain or impede or redirect flood flows, or otherwise generate substantial hazards related to flooding. It is possible that cultivation activities could take place in an area subject to flooding, including as a result of dam failure, tsunami, or seiche, or subject to inundation by a mudflow; however, site-specific conditions such as the potential for such flooding or mudflow to harm workers at the cultivation site would be

addressed by local permitting authorities. Therefore, these criteria are not discussed further.

Accordingly, this analysis focuses on impacts on water quality and surface water and groundwater supplies from cultivation activities associated with the Proposed Program. The extent to which the above criteria are relevant to cumulative site development is considered in Chapter 6, *Cumulative Considerations*.

Environmental Impacts of the Proposed Program

General Cultivation Impacts

Impact HWQ-1: Cause adverse effects on beneficial uses from surface water diversions for crop irrigation, or cause insufficiency of surface water supplies. (Less than Significant)

General cultivation impacts include impacts of any type of cultivation activity: outdoor, mixed-light, indoor, nursery, and processing.

The diversion of surface water for use in irrigating cannabis crops has the potential for several impacts on water quality or quantity. This would be the case whether the cultivator is directly diverting the water or obtaining surface water from another provider (e.g., a municipal water supply or a water delivery service). In the latter case, the potential impacts would occur at the location where the provider is diverting the water, rather than at the cultivation site. Multiple diversions of the same water source would be of particular concern.

As part of the application process, Proposed Program applicants would be required to identify their operations' water supply source and provide supplemental information regarding the source (Sections 8102(b)(24) and 8109 of the Proposed Regulations). An applicant proposing to use a surface water diversion (or a diversion of underflow from a surface waterbody) would need to provide evidence that the diversion is authorized by the SWRCB. As part of this authorization process, SWRCB would establish seasons of diversion and minimum bypass flows to protect instream beneficial uses and prevent exceedances of water quality standards or other adverse water quality impacts, and otherwise condition the diversion to ensure that other legal users of water are not adversely affected. As required by California Water Code 13149, SWRCB (in coordination with CDFA and CDFW) is currently developing principles and guidelines specific to water diversions for cannabis cultivation, the compliance with which would be required by Section 8313(a) of the proposed regulations.

For an applicant planning to obtain surface water supplies from a water purveyor, the purveyor also would be required to have a valid water right and would be subject to the same requirements of SWRCB.

The measures that would be required by the SWRCB to protect water quality, instream beneficial uses, and other legal users of water would avoid substantial impacts on water quality and water supplies from surface water diversions. Cultivation without a sufficient water supply would be infeasible and could not be licensed under the Proposed Program. Therefore, this impact would be **less than significant**.

Impact HWQ-2: Cause aquifer depletion from use of groundwater for crop irrigation and result in insufficiency of groundwater supplies. (Less than Significant)

The use of groundwater for cannabis crop irrigation has the potential to reduce groundwater levels and contribute overdraft of aquifers or adverse impacts on neighboring wells. This would be the case whether the cultivator is pumping the water directly or obtaining groundwater from a provider (e.g., a municipal water supply or a water delivery service). In the latter case, the potential impacts would occur at the location(s) where the provider is pumping the water, rather than at the cultivation site. Multiple users of the same groundwater source would have the greatest potential for adverse effects.

Groundwater is not subject to the same water rights process described in Impact HWQ-1 for surface water; however, as discussed in Section 4.8.2, "Regulatory Setting," SGMA requires the development of GMPs that will address overdraft within various groundwater basins, considering all groundwater users in the basin (not just cannabis cultivators). However, this process, which is in early stages as of the publication of this PEIR, does not prescribe specific measures which would apply to the Proposed Program.

Available information suggests that existing cannabis cultivation has less often occurred in low-lying valleys/traditional agricultural areas, where typically major alluvial groundwater basins are located. This could change under the Proposed Program, with cultivators potentially moving or establishing their operations to prime farmland, where groundwater sources may be more available.

According to Hammon et al. (2015), water use requirements for outdoor cannabis production (25-35 inches per year)[3] are generally in line with water use for other agricultural crops, such as corn (20-25 inches per year), alfalfa (30-40 inches per year), tomatoes (15-25 inches per year), peaches (30-40 inches per year), and hops (20-30 inches per year). In a study of cannabis cultivation in Humboldt County, approximate water use for an outdoor cultivation site was 27,470 gallons (0.08 acre-foot) per year on average and ranged from approximately 1,220 to 462,000 gallons per year (0.004 to 1.4 acre-feet), with the size of the operation being a major factor in this range. Annual water uses for a greenhouse operation averaged approximately 52,300 gallons (0.16 acre-foot) and ranged from approximately 610 to 586,000 gallons (0.002 to 1.8 acre-feet) annually (Butsic and Brenner 2016). During a field visit conducted by technical staff to an outdoor cultivation site, one cultivator reported using approximately 75,000 gallons (0.23 acre-feet) for 1 year's entire cannabis crop (approximately 66 plants), or approximately 1,140 gallons per plant per year.

Based on the relatively low quantities of water use (from 0.002 to 1.8 acre-feet per year), the likelihood that an individual cultivator or group of cultivators using groundwater from a defined alluvial aquifer would, by themselves, cause substantial groundwater overdraft is considered unlikely, for several reasons. First, groundwater overdraft is typically caused by the combination of various uses in a basin and is not typically attributable to a particular

[3] Inches per year can be converted to a volume by multiplying the number of inches by the area being irrigated. For example, 12 inches (1 foot) per year applied over an area of 1 acre would be a volume of 1 acre-foot; 12 inches per year applied over an area of 10,000 square feet would be a volume of 120,000 cubic feet (approximately 900,000 gallons), or 2.8 acre-feet.

user or set of users; in other words, it is typically a cumulative issue (which is discussed in more detail in Chapter 6, *Cumulative Considerations*). In addition, the size limitations for cultivation sites under the Proposed Program would limit the maximum extent of water use. For instance, the highest estimate, provided by Hammon et al. (2015), would result in less than 3 acre-feet of annual usage at the largest allowable cultivation site of 1 acre. Finally, no information is available to suggest that there would be high concentrations of cultivators using groundwater from an alluvial basin in a particular location in a manner that could substantially affect neighboring wells.

Use of groundwater as a source in areas without a clearly defined aquifer (such as in the mountainous regions of the Coast Ranges and Sierra-Nevada foothills) would be diverting subsurface flows either from a surface water body (discussed above in Impact HWQ-1), or from a fractured bedrock aquifer, in which groundwater is found in the fractures and crevasses between the bedrock. In these settings, an individual well could affect other downgradient wells that are diverting from the same fracture system. The potential for impacts would be highly site dependent, considering factors such as the subsurface hydrogeology of the fracture aquifer system, the volume of water in the aquifer, and the hydraulic connectivity between the various wells. Due to complicated subsurface conditions related to a fractured bedrock aquifer system and the difficulties in mapping them, it is often impossible to correlate extraction in one location to a change in water availability in another. The likelihood that one well could substantially affect another well is possible, but it would be speculative to make a significance conclusion without site-specific details and in-depth study.

Note that the Proposed Program regulations would require license applicants to provide information in the cultivation plan regarding the water source(s) to be used for cultivation, including the location of any groundwater diversions, pumps, and diversion systems (Section 8301[a][11][A]). In this manner, information would be available to assist in the evaluation of site-specific impacts, should there be reports or complaints of impacts on neighboring wells or overall aquifer volume. In such circumstances, a site-specific evaluation could be conducted to evaluate whether significant impacts related to groundwater may be occurring at a particular location due to cannabis cultivation. To address the possibility that significant impacts on water resources could result that have not been considered in this PEIR, a subsequent, site-specific CEQA document would be required, for instance as a part of the approval process undertaken by the local agency and/or responsible agency (including, potentially, CDFA).

In light of these factors, this impact is considered **less than significant**.

Outdoor and Mixed-Light Cultivation (including Nurseries Using Outdoor or Mixed-Light Cultivation Techniques)

Impact HWQ-3: Cause discharges of sediment, nutrients, or other contaminants (excluding pesticides) from outdoor or mixed-light cultivation. (Less than Significant)

Mixed-light and outdoor cultivation operations under both baseline conditions and the Proposed Program involve ground-disturbance during planting and soil preparation activities that could mobilize sediment, as well as exposed soils that could be mobilized during storm events, causing erosion to surface waterbodies. Current unpermitted cultivation operations also have discarded trash, haphazardly managed human waste, and

improperly stored hazardous materials (e.g., diesel and gasoline) (Gabriel et al. 2013, NCRWQCB 2013, CVRWQCB 2014). Fertilizers used at existing unpermitted cultivation sites are often mixed directly in the water source, thereby contaminating streams (SWRCB et al. 2014).

These activities could potentially result in exceedances of applicable water quality standards in receiving waterbodies; however, it is anticipated that many of these activities would not continue or would improve under the Proposed Program. As described in Section 4.7, *Hazards, Hazardous Materials, and Human Health,* the Proposed Program regulations (Section 8305[b]) would require that licensees manage all hazardous waste in compliance with all applicable hazardous waste statutes and regulations.

Additionally, cultivators with potential to discharge contaminants to surface water or groundwater would be required to comply with applicable RWQCB or SWRCB permits (Section 8102[b][18]). As described in Section 4.8.2 above, NCRWQCB and CVRWQCB orders specific to cannabis cultivation contain measures to ensure that water quality measures are not exceeded. SWRCB is currently developing additional guidance specific to cannabis cultivation. During the interim period while the guidance is in development, in regions without a general order, individual WDRs would be needed for regulated discharges to waters of the State, which would be anticipated to be at least as protective as the provisions of the NCRWQCB and CVRWQCB General Orders. WDRs would generally include requirements related to the following topics:

- Water supply, storage and use;
- Erosion and sediment control
- Grading/excavation
- Road construction
- Potting soil and amendments
- Fertilizers
- Pesticides and other chemicals
- Poisons
- Petroleum products
- Vegetation restoration and management
- Drainage and stream crossings,
- Work in streams and ponds,
- Riparian and wetland protection
- Waste management
- Irrigation runoff

Finally, cultivation sites located in jurisdictions that are subject to Phase I or Phase II municipal stormwater permits may be required to implement post-construction stormwater control measures, either as part of the local permitting process or under the statewide Construction General Permit or General Industrial Permit. Compliance with these various regulations and associated requirements would reduce or avoid discharges of contaminants to waters of the State, and would be protective of water quality and beneficial uses. This impact would be **less than significant**.

Impact HWQ-4: Cause water quality impacts from pesticide use in outdoor or mixed-light cultivation. (Less than Significant)

Pesticide use in outdoor or mixed-light cultivation could have potential to adversely affect water quality if pesticides were applied such that they could enter surface water or groundwater bodies. In general, pesticides can be toxic to aquatic life and can adversely affect beneficial uses; the *Human Health and Ecological Screening Risk Evaluation* (Appendix F) found that several chemicals that may be used by cultivators are toxic to amphibians, fish, and aquatic invertebrates.

Cultivators would be required to comply with requirements of the ILRP. In addition, the proposed regulations would include several environmental protection measures (Section 8313[f]), as follows, to prevent pesticides from entering water bodies:

- Comply with all pesticide label directions.
- Store chemicals in a secure building or shed to prevent access by wildlife.
- Contain any chemical leaks and immediately clean up any spills.
- Apply the minimum amount of product necessary to control the target pest.
- Prevent off-site drift.
- Do not spray directly to surface water or allow pesticide product to drift to surface water. Spray only when wind is blowing away from surface water bodies.
- Do not apply pesticides when they may reach surface water or groundwater.

These measures would minimize the potential for discharges to surface water or groundwater, such that any such discharges would be unlikely to result in violations of water quality standards or substantial degradation of beneficial uses. In particular, these measures were identified by the *Human Health and Ecological Screening Risk Evaluation* as sufficiently protective to prevent possible significant impacts on aquatic life. Implementation of the above measures would, therefore, be anticipated to prevent substantial adverse water quality impacts from pesticide use in outdoor and mixed-light cannabis cultivation. Therefore, this impact would be **less than significant.**

Indoor Cultivation (including Nurseries Using Indoor Cultivation Techniques)

Impact HWQ-5: Cause discharges of sediment, nutrients, and other contaminants (excluding pesticides) from indoor cultivation operations. (Less than Significant)

Impacts from indoor cultivation would be similar to those described for outdoor and mixed-light cultivation operations in Impact HWQ-4. However, the potential for direct discharge to surface waterbodies would be greatly reduced due to the operation being conducted indoors. In addition, soil erosion from ground disturbance during cultivation activities would be unlikely.

However, contaminants could still be transported through irrigation return flows and enter storm drainage systems. In locations without an established storm drainage system, discharges could travel directly to receiving waters.

The same regulatory framework would apply to indoor cultivation as described above for mixed-light and outdoor cultivation. To ensure that cultivators comply with these regulatory requirements, the Proposed Program regulations require that cultivators with potential for discharges to surface water or groundwater provide evidence of coverage under the applicable SWRCB and RWQCB permits as part of their application (Section 8102[b][18]). Therefore, this impact would be **less than significant**.

Impact HWQ-6: Cause water quality impacts from pesticide use in indoor cultivation. (Less than Significant)

Indoor cultivation would have low potential to cause water quality impacts from pesticide use. Indoor cultivation sites may be connected to municipal wastewater systems or onsite treatment systems to dispose of wastewater. Refer to Section 4.14, *Utilities and Service Systems,* for potential impacts from disposal of wastewater from cannabis cultivation. Applications of pesticides in indoor settings would have limited potential to reach surface water bodies, and this mode of exposure was not evaluated in the *Human Health and Ecological Screening Risk Evaluation* because it is not considered to be a complete exposure pathway. Indoor cultivators under the Proposed Program also may be subject to Phase I or II MS4 permit requirements limiting stormwater discharges from their facilities (see Section 4.8.2), which would limit potential for pesticides to migrate off-site. Therefore, this impact would be **less than significant**.

4.9 Land Use and Planning

4.9.1 Introduction

This section of the Program Environmental Impact Report (PEIR) presents the environmental setting and potential impacts of the California Department of Food and Agriculture's CalCannabis Cultivation Licensing program (Proposed Program) related to land use and planning. Some information relevant to this and other PEIR chapters, such as the overall approach to the environmental setting and overall approach to the regulatory setting, including reliance on existing local and State laws and regulatory programs, is described in Section 4.0, *Introduction to the Environmental Analysis*.

Information regarding land use and planning presented in this section is primarily based on County and city municipal codes and cannabis cultivation regulations. Table E-1 in **Appendix E**, *Summary of Existing and Proposed Local Commercial Cannabis Cultivation Regulations,* summarizes commercial cannabis cultivation regulations that have been adopted by local jurisdictions for every county in the State (as of May 26, 2017). Table E-2 summarizes city ordinances adopted by the 10 largest cities in California by population.

4.9.2 Regulatory Setting

Federal and State Laws, Regulations, Plans, and Policies

Several agencies established by State or federal law have authority over land use planning and development activities within their jurisdictions, such as the California Coastal Commission, the Bay Conservation and Development Commission, Local Agency Formation Commissions (LAFCOs), and the Tahoe Regional Planning Agency. This authority may include oversight over new development to support cannabis cultivation, as well as cultivation activities themselves. While site development is outside the scope of the Proposed Program (as detailed in Section 4.0, *Introduction to the Environmental Analysis*), cannabis cultivation operations would be required to comply with any applicable land use plans overseen by these agencies. An example would be the requirements of Local Coastal Programs developed by local governments located in the Coastal Zone and certified by the California Coastal Commission. Because of the statewide focus of this PEIR, the requirements of these agencies are not discussed in detail. As with local jurisdictions, all cultivators would be required to have already obtained any necessary land use or site development approvals from these agencies before requesting a license under the Proposed Program.

Local Laws, Regulations, Plans, and Policies

Land use regulation has transformed from policies directed exclusively to public nuisance laws (1850s to 1900), to dividing a city into districts and applying specific regulations to each district (i.e., zoning) in the first half of the last century (1900 to 1960s), to the expanded regulatory controls and land use policies and practices used today (1970s to present day). Post–World War II housing and development growth in California brought regional problems such as urban sprawl, smog, and traffic congestion. To address these issues, in 1972, California mandated comprehensive long-term planning documents and

required consistency between zoning and land use approvals with those plans. In addition, beginning in the 1960s, areawide planning and regional control agencies were developed to address environmental and planning issues that extend beyond city limits (Longtin 1999).

The right of local agencies (i.e., cities and counties) to have broad land use authority to enact the planning mandates described above has been established by the California Constitution and federal and State court cases. Local agencies have land use authority so long as local laws do not conflict with State general laws and there is no statutory prohibition or preemption of the local agency's regulatory authority (City of San Luis Obispo 2015). Local agencies have "police power," which is the power to establish land use and zoning laws governing a community's development and use, with the purpose of protecting the public health, safety, and welfare of residents within its jurisdiction. Cities and counties adopt general plans and implement land use and zoning laws to execute local land use vision and values.

General plans are long-range planning documents that cities and counties are required to develop and periodically update. These documents serve as a blueprint for the future planning and growth of counties and cities, setting forth development policies, objectives, principles, and standards. Many general plans include goals and policies intended to preserve natural resources, including open space, biological resources, agricultural lands, water resources, and scenic views. Other goals and policies are established to guide transportation planning, ensure provision of adequate public services, minimize exposure of community residents to excessive noise, and reduce other environmental effects such as air pollutant emissions. While this PEIR does not summarize all relevant policies contained in each city and county general plan because of the infeasibility of providing this summary for dozens of counties and hundreds of cities, it provides a broad summary of the typical intended purpose of general plan policies, which is to reduce or minimize significant environment effects associated with various types of site development and land use, including cannabis cultivation.

In addition, many local jurisdictions have adopted—or are considering adopting—ordinances pertaining to cannabis cultivation. These local ordinances are generally intended to address and avoid land use conflicts and concerns. While cannabis cultivation regulations vary between local jurisdictions, many of them specify zoning requirements for cannabis cultivation and limit the number of plants in certain zoning districts. Other jurisdictions have not established such requirements. For example, one county had drafted an ordinance allowing indoor and outdoor cannabis cultivation in residential, commercial, and other land use zones based on a tiered permit system subject to zoning clearance certificates or administrative use permits. Meanwhile, the City of San Jose specifies that cannabis cultivation collectives may be allowed only in industrial/commercial zoning districts. Table E-1 in Appendix E, *Summary of Existing and Proposed Local Commercial Cannabis Cultivation Regulations,* summarizes commercial cannabis cultivation regulations that have been adopted by local jurisdictions for every county in California (as of January 6, 2017). Table E-2 summarizes city ordinances adopted by the 10 largest cities in California by population. Section 4.0, *Introduction to the Environmental Analysis*, of this PEIR discusses how the Proposed Program considers local regulations and authority.

In addition, applicants under the CalCannabis Cultivation Licensing program would be required to comply with CEQA, general plan policies, and any local laws and regulations as part of the approval process. For individual licenses, a site-specific evaluation would be

necessary to evaluate whether significant impacts could occur at a particular location. To determine the extent to which significant impacts are possible that have not been considered in this PEIR, a site-specific CEQA document would be required. During preparation of these CEQA documents, the lead agency would evaluate the potential for significant land use impacts that could result from cultivation activities; other responsible agencies, including CDFA, may provide comment on those CEQA documents. In cases where the local jurisdiction does not issue approvals for cannabis cultivation and no other lead agency exists, CDFA may serve as the lead agency for these site-specific CEQA evaluations. Therefore, issues regarding impacts on land use and planning would be addressed and resolved on a site-specific level.

4.9.3 Environmental Setting

Predominant land uses throughout the state vary from region to region. Figure 1-1 shows the locations of major cities throughout California. As shown in this figure, the primary metropolitan areas are the San Francisco Bay Area and the greater Los Angeles area. Other major urban and developed areas are centered around the cities of San Diego, Sacramento, and Fresno, among others. In general, agricultural uses are predominant in the Sacramento and San Joaquin Valleys but are also found in other portions of the state (see Figure 4.2-1 in Section 4.2, *Agriculture and Forestry Resources*). The more mountainous regions, such as the Sierra Nevada mountains, Cascade Range, and Klamath Mountains, tend to be forested and sparsely populated. Cannabis cultivation can occur within many land use types, although the type and scale of operations varies based on local factors. In general, land uses types that currently support mixed-light or outdoor cultivation include agricultural, semi-rural, and rural land uses. Indoor cannabis cultivation is currently supported in industrial and commercial land uses. For instance, many portions of the state, even those with extensive amounts of agriculture, do not have climates suitable for outdoor cannabis cultivation.

The potential for cannabis cultivation that is unpermitted or not in compliance with Proposition (Prop.) 215 to result in community conflicts or planning issues has been widely recognized as a topic of concern. For example, the California Police Chiefs Association (2012) cited in a 2008 *Los Angeles Times* article (Reiterman and Bailey 2008), which reported that as many as 1,000 of the 7,500 homes in Arcata, Humboldt County, were being used to cultivate cannabis at that time. The authors reported that this had an effect on the available housing stock, as well as spreading building-safety problems and sowing neighborhood discord (Reiterman and Bailey 2008). Some jurisdictions, such as Calaveras County, are concerned about land purchases by speculators for the purposes of cannabis cultivation and the related impact on property values and local community character.

4.9.4 Impact Analysis

Methodology

The analysis of land use and planning is qualitative and focuses on applicable land use policies, plans, and programs. Due to the statewide scope of the Proposed Program, and the fact that regional and local plans, including those governing cannabis cultivation, change over time, it was not considered feasible for this analysis to specifically address individual jurisdictions and their plans and policies, and such an analysis would have limited utility over time.

Significance Criteria

For the purposes of this analysis, based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines, the Proposed Program would result in a significant impact related to land use and planning if it would:

A. Physically divide an established community;

B. Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including a general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect; or

C. Conflict with any applicable habitat conservation plan or natural community conservation plan.

Criterion C regarding potential conflicts with applicable habitat conservation plans or natural community conservation plans is addressed in Section 4.4, *Biological Resources*, in Impacts BIO-7 and BIO-8 and is therefore not discussed further in this section.

Environmental Impacts of the Proposed Program

General Cultivation Impacts

Impact LU-1: Physically divide an established community. (Less than Significant)

General cultivation impacts include impacts of any type of cultivation activity: outdoor, mixed-light, indoor, nursery, and processing.

Cannabis cultivation is not a land use type that would typically physically divide an established community (such as construction of a road or railway through an existing developed area). It is unlikely that a local jurisdiction would approve cultivation activities that physically divide its community. The ordinances adopted to date suggest that, to the contrary, the requirements of local jurisdictions would generally avoid such an outcome. The extent to which such a division could occur due to cannabis cultivation in any particular community (or in a neighboring community) would be based on the future decisions of the local jurisdiction in the context of its existing and/or future land use plans and policies.

Applicants under the CalCannabis Cultivation Licensing program would be required to comply with general plan policies, and any local ordinances as part of the approval process undertaken by the local agency and/or other responsible agencies. As part of application review, CEQA would consider site-specific information to evaluate whether significant impacts related to physically dividing a community could occur at a particular location. If significant impacts are possible that have not been considered in this PEIR, a site-specific CEQA document would be required. During preparation of these CEQA documents, the lead agency would evaluate the potential for significant land use impacts, including dividing an established community, that could result from cultivation activities. This lead agency would often be the local jurisdiction, in which case other responsible agencies, including CDFA, may provide comment on those CEQA documents. In the absence of a local approval process for cultivation, other agencies with discretion, potentially including CDFA, may undertake such an analysis. Therefore, issues regarding impacts on land use and planning would be addressed and resolved on a site-specific level.

For these reasons, there would be **a less-than-significant impact** related to physical division of an established community.

Impact LU-2: Conflict with applicable land use plans, policies, or regulations. (Less than Significant)

As described in Section 4.9.3, unpermitted and/or illegal cannabis cultivation has been reported to conflict with applicable land use plans, policies, or regulations, and many local jurisdictions have adopted or are developing ordinances related to cannabis cultivation. Appendix E summarizes local ordinances pertinent to commercial cannabis cultivation that have been adopted by counties and major cities in California. Many of these ordinances include measures to avoid planning conflicts and maintain community character. Examples include limiting cultivation to particular zoning districts, limiting the allowable number of plants, requiring setbacks from property lines, and requiring fencing to screen views of cultivation sites. Some local jurisdictions have opted to ban cannabis cultivation altogether.

Requirements of the Proposed Program would help ensure that cannabis cultivation activities are conducted in accordance with State and local laws and regulations, including local land use plans, local coastal programs, and zoning ordinances.

The extent to which local plans and policies—in particular, ordinances addressing cannabis cultivation—are adequate to address community concerns and planning issues is beyond the scope of CDFA's regulatory authority under the Proposed Program. This is a topic to be addressed at the local level. Under the Proposed Program regulations, an applicant for a license must be in compliance with all local laws and regulations. CDFA assumes that such local laws and regulations would prevent establishment of activities, including cannabis cultivation, that conflict with their plans and policies.

Concern has also been expressed that some portion of the licensed cultivators would operate out of compliance with local approvals and related plans and policies (i.e., be unpermitted), or that cultivation in a particular jurisdiction could result in conflicts with the plans and policies of neighboring jurisdictions. The extent to which either of these outcomes may occur, and the locations where they may occur, is unknown. Additionally, monitoring and enforcing cultivators' compliance with local land use requirements after issuance of licenses is beyond CDFA's regulatory authority. CDFA assumes that such compliance would be monitored at the local level in accordance with local jurisdictions' underlying enforcement policies and police power. This topic is therefore considered a subject of speculation and is not discussed further.

For the reasons discussed above, CDFA has determined that cannabis cultivation activities licensed under the Proposed Program would not conflict with any land use plans and policies. This impact would be **less than significant**.

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4.10 Noise

4.10.1 Introduction

This section of the Program Environmental Impact Report (PEIR) presents the environmental setting and potential impacts of the California Department of Food and Agriculture's (CDFA's) CalCannabis Cultivation Licensing program (Proposed Program) related to noise and vibration. In addition, this section provides fundamentals of noise and vibration and a regulatory setting related to those topics.

Information regarding noise presented in this section is primarily based on the following sources:

- Manufacturer's information on equipment used in cannabis cultivation operations;
- Online information related to cannabis cultivation and equipment requirements;
- Site visits to various medical cultivation operations, including outdoor, indoor, mixed-light, and nursery cultivation facilities, and consultation with cultivators and other cannabis cultivation experts; and
- The Federal Transit Administration's (FTA's) *Transit Noise and Vibration Impact Assessment* (2006).

4.10.2 Acoustic Fundamentals

Noise is generally defined as loud, unpleasant, unexpected, or undesired sound typically associated with human activity and that interferes with or disrupts normal activities. Although exposure to high noise levels has been demonstrated to cause hearing loss, the principal human response to environmental noise is annoyance. The response of individuals to similar noise events is diverse and influenced by the type of noise, time of day, perceived importance of the noise, sensitivity of the individual, its appropriateness in the setting, and the type of activity during which the noise occurs.

Sound is a physical phenomenon consisting of vibrations that travel through a medium, such as air, and are sensed by the human ear. Sound is generally characterized by several variables, including frequency and intensity. Frequency describes the pitch of a sound and is measured in Hertz (Hz), whereas intensity describes the loudness of sound and is measured in decibels (dB), using a logarithmic scale. A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above about 120 dB begin to be felt inside the human ear as discomfort and eventually as pain at still higher levels. The minimum change in the sound level of individual events that an average human ear can detect is approximately 3.0 dB. The average person perceives a change in sound level of approximately 10 dB as a doubling (or halving) of the sound's loudness; this relation holds true for sounds of any loudness. Examples of typical noise levels are provided in **Table 4.10-1**. Land use compatibility standards established by the California Governor's Office of Planning and Research (OPR) are shown in **Table 4.10-2**.

Because of the logarithmic nature of the dB measurement unit, sound levels cannot be added or subtracted directly and are somewhat cumbersome to handle mathematically; however, some simple rules are useful in dealing with sound levels. For example, if the intensity of a sound is doubled, the sound level increases by 3.0 dB, regardless of the initial sound level. Thus, by way of example, 60 dB + 60 dB = 63 dB, and 80 dB + 80 dB = 83 dB.

Table 4.10-1. Examples of Common Noise Levels

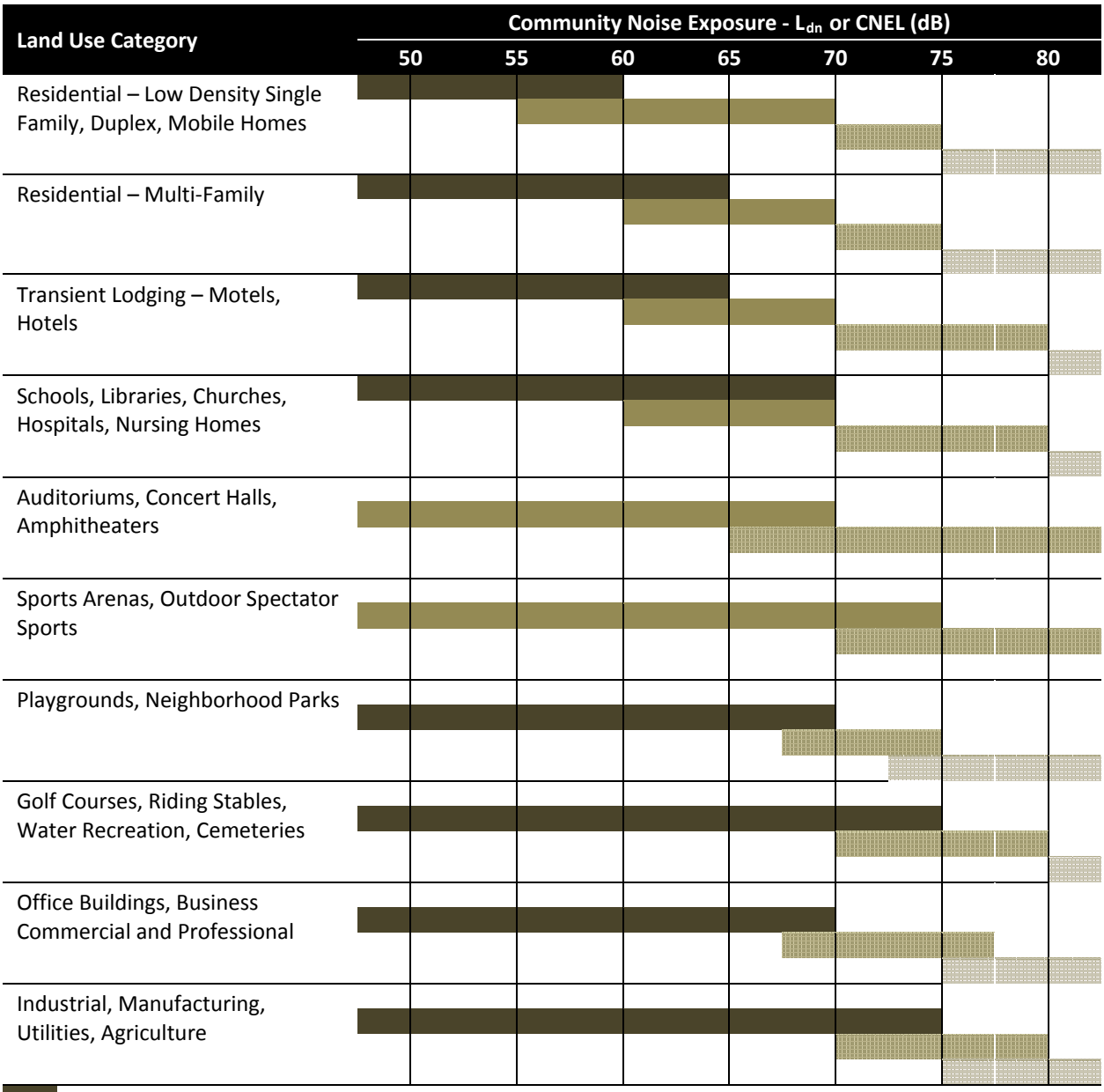
Common Outdoor Activities	Noise Level (dBA)
Jet flyover at 1,000 feet	110
Gas lawnmower at 3 feet	100
Diesel truck at 50 feet traveling 50 miles per hour	90
Noisy urban area, daytime	80
Gas lawnmower at 100 feet, commercial area	70
Heavy traffic at 300 feet	60
Quiet urban area, daytime	50
Quiet urban area, nighttime	40
Quiet suburban area, nighttime	30
Quiet rural area, nighttime	20

Source: California Department of Transportation (Caltrans) 2009

The frequency of a sound is a measure of how many times per second the crest of a sound pressure wave passes a fixed point. For example, when a drummer beats a drum, the skin of the drum vibrates a certain number of times per second. A particular tone that makes the drum skin vibrate 100 times per second generates a sound pressure wave that oscillates at 100 Hz, and this pressure oscillation is perceived as a tonal pitch of 100 Hz. Sound frequencies between 20 and 20,000 Hz are within the range of sensitivity of the best human ear.

Sound from a tuning fork (a pure tone) contains a single frequency; however, most sounds that one hears in the environment consist of a broad band of frequencies differing in sound levels. The method commonly used to quantify environmental sounds consists of evaluating all of a sound's frequencies according to a weighting system that reflects human hearing, which is less sensitive at low frequencies and extremely high frequencies, but better at sensing mid-range frequencies (unsurprisingly, within the sound spectra usually associated with speech and music). This system is called "A" weighting, and the dB level measured is called the "A-weighted" sound level (dBA). In practice, a noise source is measured using a sound-level meter that includes a filter that corresponds to the dBA curve of frequency-dependent dB adjustments.

Table 4.10-2. State Land Use Compatibility Standards for Community Noise Environment



	Normally Acceptable	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
	Conditionally Acceptable	New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.
	Normally Unacceptable	New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
	Clearly Unacceptable	New construction or development generally should not be undertaken.

Notes: CNEL = community noise equivalent level; dB = decibel; Ldn = day-night sound level.

Source: California Governor's Office of Planning and Research (OPR) 2003

Although dBA might adequately indicate the level of environmental noise at any point in time, noise levels in a given environment vary continuously. Most environmental noise includes a conglomeration of noise from distant sources that creates a relatively steady background noise in which no particular source is identifiable. To measure this background noise, a single descriptor called the equivalent sound level (L_{eq}) is used. L_{eq} is the energy mean dBA during a measured time interval and is the "equivalent" constant sound level that would be produced by a given source to equal the fluctuating level measured.

In addition, it is often desirable to know the acoustic range of the noise source being measured. This is accomplished through the L_{max} and L_{min} indicators, which represent the root mean square maximum and minimum obtainable noise levels during the monitoring interval. The L_{min} value obtained for a particular monitoring location is often called the "acoustic floor" for that location. Also useful is the L_X indicator, which provides the sound level that is exceeded for a cumulative X percent of a given measurement period. For example, an L_{90} value is often considered a good approximation of aggregate acoustical contribution from continuous sources of noise in an ambient outdoor measurement because the level is exceeded ninety percent (90 percent) of the time over the measurement period. The L_{50}, on the other hand, is often called the "median" sound level as it is exceeded half of the time over a measurement period.

Another important noise descriptor is the day–night noise level, or L_{dn}. This value is calculated as the 24-hour L_{eq} value, but with a 10-dBA penalty assessed for noise measured during nighttime hours (10 p.m. to 7 a.m.) to emphasize the heightened sensitivity to noise at night, when most people are sleeping.

4.10.3 Vibration Fundamentals

Ground-borne vibration propagates from the source through the ground to adjacent buildings by surface waves. Vibration may be composed of a single pulse, a series of pulses, or a continuous oscillatory motion. The frequency of a vibrating object describes how rapidly it is oscillating, measured in Hertz (Hz). Most environmental vibrations consist of a composite, or "spectrum," of many frequencies. The normal frequency range of most ground-borne vibrations that can be felt generally starts from a low frequency of less than 1 Hz to a high of about 200 Hz. Velocity or acceleration are usually used to describe the response of humans, buildings, and equipment to vibration (FTA 2006). Vibration information in this document has been described in terms of the peak particle velocity[1] (PPV), measured in inches per second, or of the vibration level measured with respect to root-mean-square[2] vibration velocity in decibels (VdB), with a reference quantity of 1 micro-inch per second.[3] Although PPV is appropriate for evaluating the potential of building

[1] The PPV is defined as the maximum instantaneous peak of the vibration signal (FTA 2006).

[2] Because the net average of a vibration signal is zero, the root mean square (rms) amplitude is used to describe the "smoothed" vibration amplitude. The RMS of a signal is the average of the squared amplitude of the signal (FTA 2006).

[3] Decibel notation acts to compress the range of numbers required to describe vibration. Vibration velocity level in decibels is defined as $L_v = 20 \times \log10(v/v_{ref})$, where L_v is the velocity level in decibels, v is the rms velocity amplitude, and v_{ref} is the reference velocity amplitude. VdB are provided in reference to a vibration velocity level of 1 micro-inch per second because that is the point at which the sound level approximately equals the average vibration velocity level (FTA 2006). Because of variations in the reference velocity units

damage, it is not suitable for evaluating human response and VdB is used instead. The term "Vdb" is used to represent vibration decibels to reduce the potential for confusion with the noise sound decibel (dB) (FTA 2006).

Vibration energy dissipates as it travels through the ground, causing the vibration amplitude to decrease with distance away from the source. High-frequency vibrations reduce much more rapidly than do those characterized by low frequencies, so that in a far-field zone distant from a source, the vibrations with lower frequency amplitudes tend to dominate. Soil properties also affect the propagation of vibration. When ground-borne vibration interacts with a building, a ground-to-foundation coupling loss usually results but the vibration also can be amplified by the structural resonances of the walls and floors. Vibration in buildings is typically perceived as rattling of windows, shaking of loose items, or the motion of building surfaces. In some cases, the vibration of building surfaces also can be radiated as sound and heard as a low-frequency rumbling noise, known as ground-borne noise.

Ground-borne vibration is generally limited to areas within a few hundred feet of certain types of industrial operations and construction/demolition activities, such as pile driving. Road vehicles rarely create enough ground-borne vibration amplitude to be perceptible to humans unless the receiver is in immediate proximity to the source or the road surface is poorly maintained and has potholes or bumps. Human sensitivity to vibration varies by frequency and by receiver. Generally, people are more sensitive to low-frequency vibration. Human annoyance also is related to the number and duration of events; the more events or the greater the duration, the more annoying it becomes.

4.10.4 Regulatory Setting

Federal Laws, Ordinances, Regulations, and Standards

The following guidelines at the federal level direct consideration of a broad range of noise issues:

- Noise Control Act of 1972 (Title 42 U.S. Code [USC] Section 4910) and
- U.S. Department of Housing and Urban Development (HUD) Noise Guidelines (Title 24, Code of Federal Regulations [CFR] Section 51, Subpart B) (HUD 2009).

Furthermore, the U.S. Environmental Protection Agency (USEPA) has published a guideline document that specifically addresses issues of community noise (USEPA 1974). This report, commonly referred to as the "levels document," contains goals for noise levels affecting residential land use: less than 55 dBA L_{dn} for exterior levels and less than 45 dBA L_{dn} for interior levels. The HUD Noise Guidebook (HUD 2009; Chapter 2, Section 51.101[a][8]) also recommends that exterior areas of frequent human use follow the USEPA guideline of

between the United States and the rest of the world, it is important to be clear about what reference quantity (unit) is being used whenever velocity levels are specified. All vibration levels in this analysis are referenced to $1x10^{-6}$ inches per second (1 micro-inch per second), which is consistent with the recommended methodology in the FTA (2006), *Transit Noise and Vibration Impact Assessment*, guidance document.

55 dBA L_{dn}. However, the same section of these guidelines indicates that a noise level of up to 65 dBA L_{dn} can be considered acceptable.

Occupational exposure to noise is regulated by 29 CFR Section 1910.95, Occupational Noise Exposure. In summary, this regulation describes the employer's responsibility to implement feasible administrative or engineering controls, provide personal protective equipment, and/or implement a hearing conservation program to protect employees against the effects of noise exposure that exceeds an average of 90 dBA for an 8-hour period.

Federal Transit Administration Guidelines

Noise

FTA has published guidance for assessment of noise and vibration impacts for transit projects, including construction activity (FTA 2006). Although the Proposed Program is not transit-related or construction-related, the FTA guidelines provide a widely accepted method for analyzing noise and vibration impacts, specifically those related to mechanical equipment, that may be used for cannabis cultivation activities. FTA has developed three "sensitive" land use categories to evaluate the compatibility of predicted noise levels, as described below and also provided in Table 4.10-3:

- Category 1 includes land uses where quiet is an essential element, such as outdoor amphitheaters.
- Category 2 includes land uses where people sleep, such as residences.
- Category 3 includes institutional buildings where quiet is important, such as schools, libraries, and places of worship.

Categories 1 and 3 use the hourly equivalent sound level (L_{eq}[h]), whereas Category 2 uses L_{dn}. Such criteria recognize the heightened community annoyance caused by late-night or early-morning operations, and respond to the varying sensitivities of communities to projects under different ambient noise conditions. The noise criteria are to be applied outside of building locations for residential land uses and at the property line for parks and other outdoor uses.

The applicable noise criteria in this context, as shown in **Table 4.10-3**, are relative to and vary with the existing ambient sound environment in a receiving land use category.

As the existing level of ambient noise increases, the allowable level of transit noise decreases, but the total community noise exposure is allowed to increase (albeit at a reduced rate). This accounts for the unexpected result when additional noise that is less than the existing noise exposure can still cause an impact. This is clearer from the examples given in **Table 4.10-4**, which indicate the level of noise allowed for different existing levels of exposure.

Table 4.10-3. Land Use Categories and Metrics for Transit Noise Impact Criteria

Land Use Category	Noise Metric[1] (dBA)	Land Use Category
1	Outdoor $L_{eq}(h)$[2]	Tracts of land where quiet is an essential element in their intended purpose. This category includes lands set aside for serenity and quiet, and such land uses as outdoor amphitheaters and concert pavilions, as well as National Historic Landmarks with significant outdoor use.
2	Outdoor L_{dn}	Residences and buildings where people normally sleep. This category includes homes and hospitals, where nighttime sensitivity to noise is assumed to be of the utmost importance.
3	Outdoor $L_{eq}(h)$[2]	Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, and places of worship, where it is important to avoid interference with such activities as speech, meditation, and concentration. Buildings with interior spaces where quiet is important, such as medical offices, conference rooms, recording studios, and concert halls, fall into this category, as do places for meditation or study associated with cemeteries, monuments, and museums. Certain historical sites, parks, and recreational facilities also are included.

Notes: dBA = A-weighted decibels; L_{dn} = day-night sound level, dBA; $L_{eq}(h)$ = equivalent sound level for a 1-hour period, dBA

[1]Onset-rate adjusted sound levels (L_{eq}, L_{dn}) are to be used where applicable.

[2]L_{eq} for the noisiest hour of transit-related activity during hours of noise sensitivity.

Source: FTA 2006

Table 4.10-4. Noise Impact Criteria – Effect on Cumulative Noise Exposure

L_{dn} or L_{eq} in dBA (rounded to nearest whole decibel)			
Existing Noise Exposure	**Allowable Noise Exposure**	**Allowable Combined Total Noise Exposure**	**Allowable Noise Exposure Increase**
45	51	52	7
50	53	55	5
55	55	58	3
60	57	62	2
65	60	66	1
70	64	71	1
75	65	75	0

Notes: dBA = A-weighted decibels; L_{dn} = day-night sound level, dBA; L_{eq} = equivalent sound level, dBA

Source: FTA 2006

Vibration

Summarized in **Table 4.10-5**, FTA guidance indicates groundborne vibration impact levels associated with three categories of receiver sensitivity (similar to those previously described for noise) as they pertain to human annoyance. As described in Section 4.10.3, *Vibration Fundamentals*, human annoyance from vibration is measured in VdB because decibel notation acts to compress the range of numbers required to describe vibration. VdB are the vibration-related noise levels that occur when the vibration velocity reference level is 1 micro-inch per second (standard U.S. units).

Table 4.10-5. Groundborne Vibration Impact Criteria – Human Annoyance

Land Use Category	Velocity in Decibels (VdB) (reference to 1 micro-inch/second)		
	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]
Category 1: Buildings where Vibration Interferes with Interior Operations	65[4]	65[4]	65[4]
Category 2: Residences and Buildings where People Normally Sleep	72	75	80
Category 3: Institutional Land Uses with Primarily Daytime Usage	75	78	83

Notes:

1 "Frequent Events" is defined as more than 70 vibration events of the same source per day.

2 "Occasional Events" is defined as between 30 and 70 vibration events of the same source per day.

3 "Infrequent Events" is defined as fewer than 30 vibration events of the same kind per day.

4 This criterion limit is based on levels that are acceptable for most moderately sensitive equipment, such as optical microscopes. Vibration-sensitive manufacturing or research would require detailed evaluation to define the acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the heating, ventilating, and air conditioning (HVAC) systems and stiffened floors.

Source: FTA 2006

As shown in **Table 4.10-6**, FTA guidance indicates groundborne vibration impact levels associated with four building categories as they pertain to risk of building damage.

State Codes and Agencies

California Building Code, Title 24

Title 24, Part 2, Section 1207 of the California Building Code establishes a uniform minimum noise insulation performance standard to protect persons within hotels, motels, dormitories, apartment houses, and dwellings other than detached single-family dwellings from the effects of excessive noise, including hearing loss or impairment and interference with speech and sleep. Title 24 states that interior noise levels attributable to exterior sources are not to exceed 45 dB in any habitable room (California Building Code 2015). The noise metric must be either the L_{dn} or the CNEL, consistent with standards in the noise element of the local general plan.

Table 4.10-6. Groundborne Vibration Impact Criteria – Building Damage Risk

Building Category	Peak Particle Velocity (inches per second)	VdB (re: micro-inches per second)
Category 1*:* Reinforced Concrete, Steel, or Timber (no plaster)	0.5	102
Category 2*:* Engineered Concrete and Masonry (no plaster)	0.3	98
Category 3*:* Nonengineered Timber and Masonry	0.2	94
Category 4*:* Extreme Susceptibility to Vibration Damage (e.g., historic structures)	0.12	90

Source: FTA 2006

Local Laws, Plans, Policies, and Regulations

Cities and counties often have established general plan noise elements and/or noise ordinance thresholds that provide land use compatibility guidelines and locally acceptable standards to reduce noise conflicts between land use. OPR developed guidelines for the preparation and content of noise elements for city and county general plans. These guidelines are contained in the *State of California General Plan Guidelines* (OPR 2003).

In addition, some local jurisdictions have established noise requirements and guidelines related to cannabis cultivation. **Table 4.10-7** summarizes existing noise requirements and guidelines found in cannabis cultivation ordinances for all California counties. These would apply to noise-producing cultivation activities located on unincorporated county land. Proposed Program activities also may occur within municipalities; while these have not been summarized in this PEIR apart from the 10 largest municipalities (**Appendix E**, *Summary of Existing and Proposed Local Commercial Cannabis Cultivation Regulations*) due to the infeasibility of summarizing the numerous city ordinances, similar to the county ordinances, city ordinances approach noise in one of the following ways:

Exempt. For many jurisdictions, agricultural activities are exempt from noise standards; this exemption may be specifically stated in the ordinance.

Quantitative. Quantitative noise thresholds have been defined, or a requirement is imposed that cultivators comply with quantitative local noise thresholds/standards, typically identified in a general plan or noise ordinance. These standards commonly vary by designated land use or zoning designation, specific time of day (nighttime vs. daytime standards), and/or duration of noise-generating activity. Noise standards may be defined specifically for agricultural operations. Quantitative thresholds may be established in relation to an increase in background sound level, apply to noise caused by cultivation activities, or address the combination of noise before and with the proposed cultivation operation.

Qualitative. No quantitative thresholds exist, but noise is characterized as a potential nuisance or health and safety hazard that must generally be avoided or must not be

audible at adjoining property boundaries or residents. May include additional requirements related to harassment of specific animal species.

Defers to Other Noise Guidelines and Standards. The cultivation ordinance explicitly defers to generally applicable local noise requirements/standards.

No Noise Requirements in Cultivation Ordinance. The ordinance does not mention noise requirements or restrictions, or identify any quantitative or qualitative noise goals. In this situation, cannabis cultivation may be subject to other noise standards or agricultural operation exemptions from the applicable general plan noise elements or noise ordinances.

Local ordinances (those specific to cannabis cultivation or otherwise) may also require a noise permit, waiver, or variance application, which would be important if the activity itself (regardless of noise level) may be prohibited (or allowed) during certain periods or under certain circumstances.

Table 4.10-7. Summary of Requirements from County Cannabis Commercial Cultivation Ordinances

County(ies)	Applicable Noise Criteria (exterior unless otherwise noted)
Commercial Cultivation Prohibited (39 counties; 67 percent of California counties)	
Alameda, Alpine, Amador, Colusa, Contra Costa, Del Norte, Fresno, Glenn, Kern, Kings, Lassen, Los Angeles, Madera, Mariposa, Merced, Modoc, Mono, Napa, Nevada, Placer, Riverside, Sacramento, San Benito, San Bernardino, San Francisco, San Joaquin, San Mateo, Santa Barbara, Santa Clara, Shasta, Sierra, Siskiyou, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yuba	N/A – Commercial cannabis cultivation prohibited.
Contains Noise Requirements (5 counties; 9 percent of California counties)	
Calaveras	Any generator used in cultivation must be housed in an insulated shed; set back 75 feet from the property line, and in compliance with the county's noise ordinance.
El Dorado	Ordinance contains qualitative requirements that generally state cultivation must not adversely affect health or safety of nearby residents or properties due to noise.
Humboldt	Must maintain noise below acceptable standards. Noise produced by a generator used for cultivation shall not be audible by humans from neighboring residences. Where applicable, permittees must show that sound levels will not result in the harassment of Marbled Murrelet or Spotted Owl species.
Mendocino, Trinity	Cannabis cultivation shall not exceed applicable noise standards.

County(ies)	Applicable Noise Criteria (exterior unless otherwise noted)
No Noise Requirements in Cultivation Ordinance (6 counties; 10 percent of California counties)	
Butte	Noise not mentioned in cultivation ordinance. Some agricultural operations exempted in noise control ordinance.
Lake	Noise not mentioned in cultivation ordinance. Nuisance abatement ordinance prohibits loud and unusual noises.
Monterey	Noise not mentioned in cultivation ordinance. Restrictions on land uses/areas available for cultivation. Permittee shall comply with all applicable federal, state, and local laws, including County building, zoning, and health codes.
Santa Cruz	Noise not mentioned in cultivation ordinance. Restrictions on land uses/areas available for cultivation. All licenses prohibited from using generators.
Sonoma, Yolo	Noise not mentioned in cultivation ordinance. No noise standards found.
Commercial Cannabis Cultivation Ordinance Pending or None Adopted (8 counties; 14 percent of California counties)	
Inyo, Plumas, San Luis Obispo	Pending commercial cannabis cultivation ordinance.
Imperial, Marin, Orange, San Diego, Ventura	No cultivation ordinance adopted.

Notes:

dBA = A-weighted decibels; L_{dn} = day-night sound level, dBA; L_{eq} = equivalent sound level, dBA

Table current as of May 30, 2017. County policies are only applicable to unincorporated areas within the county and may differ from adopted policies for incorporated areas.

Note that several of the jurisdictions included in this table have not adopted ordinances for commercial cannabis cultivation. All jurisdictions have been included in this table regardless of this fact, to provide the most complete information possible given that commercial cannabis ordinances may be adopted or rescinded in the future.

4.10.5 Environmental Setting

The following discussion describes sensitive receptors and broadly characterizes the existing noise environment relevant to the Proposed Program.

Sensitive Receptors

The specific area and extent of individual cannabis cultivation operations licensed under the Proposed Program would depend on various environmental (appropriate climatic conditions for outdoor or mixed-light cannabis cultivation), economic (fees, land availability, cultivation operational costs), and land use planning (specific cannabis-related restrictions or requirements adopted by local agencies) factors. Proposed Program activities would occur in rural and urban environments depending on the type of cultivation operation. Noise-sensitive receptors are determined based on land uses where these receptors may be present or where noise-sensitive activities may occur. This includes land uses where quiet is an essential element in their intended purpose, such as indoor or outdoor concert halls; residences and buildings where people sleep; and institutional land uses with primarily daytime and evening use, such as schools, places of worship, and

libraries. Generally, commercial or industrial uses are not considered noise sensitive because, in general, the activities are compatible with higher noise levels. For parks or recreation areas, noise sensitivity reflects how the park is used and how essential quiet is to the enjoyment of the area.

An individual's reaction to noise is determined by the noise itself and the environment in which the noise occurs. Individuals accustomed to noisy environments or to uses of noise-producing equipment are less likely to consider engine noise to be intrusive than those who are not. Likewise, the use of noise-generating equipment in areas with low ambient noise levels is more likely to be considered disruptive than use in areas where noise levels are normally high.

Similarly, vibration-sensitive land uses include residences where people sleep and institutional uses such as laboratories where the activities within the building are particularly sensitive to vibration.

Existing Noise Environment

A discussion of the existing noise environment across the entire state is not feasible or warranted for this programmatic analysis, in part because of the uncertainty about specific locations where Proposed Program activities would be conducted. As previously stated, activities associated with the Proposed Program could occur in various locations throughout California, in urban, rural or agricultural areas; therefore, the magnitude range (in dBA) and characteristics of the ambient sound would vary widely depending on natural and human-made sound-emitting sources near a given location. In general, the ambient outdoor sound environment that may be measured or perceived at a given location represents an aggregate of what may be many distinct, near or far sound sources combined with an underlying indistinct background of sound energy from a multitude of other distant sources.

For the purposes of the noise impact analysis, a description of the existing ambient outdoor sound level at a noise-sensitive receiver that may be exposed to noise from cannabis cultivation activities is important with respect to California Environmental Quality Act (CEQA) assessment criteria and other relative limits that compare future or "with project" ambient levels with existing or baseline conditions, which are described in Section 4.0, *Introduction to the Environmental Analysis*. For reasonable comparisons appropriate in this analysis, FTA noise assessment guidance provides two methodologies to estimate existing noise exposure:

- Proximity to transportation routes based on the perpendicular distances to highways, railroad lines, and other major roadways; and
- Population density when noise from major surface transportation routes is far enough away, and ambient human-made noise is dominated by local street traffic, building operations (e.g., HVAC systems), and community activities.

Table 4.10-8 illustrates what distance ranges to major roadways and railroad lines yield a corresponding estimated daytime, nighttime, and L_{dn} outdoor ambient sound level. Alternately, in the absence of such major transportation routes (i.e., if they are much farther

than the indicated maximum distances), population density ranges may be used to estimate the same outdoor ambient sound levels.

Table 4.10-8. Estimated Existing Noise Exposure

FTA Method 1: Noise Generators	Distances from Major Noise Sources (feet)[1]							
Proximity to Interstate Highway[2]			> 800	400–800	200–400	100–200	50–100	< 50
Proximity to Rail[3]			500–800	240–500	120–240	60–120	30–60	10–30
Proximity to Other Roadway[4]			> 400	200–400	100–200	50–100	< 50	
FTA Method 2: Population Density	people per square mile							
	< 300	300–1,000	1,000–3,000	3,000–10,000	10,000–30,000	> 30,000		
	Estimated Sound Level (dBA)							
Nighttime L_{eq}	30	35	40	45	50	55	60	65
Daytime L_{eq}	40	45	50	55	60	65	70	75
L_{dn}	40	45	50	55	60	65	70	75

Notes: dBA = A-weighted decibel; mph = miles per hour

[1] Distances do not include shielding from intervening rows of buildings. The general rule for estimating shielding attenuation in populated areas is as follows: Assume one row of buildings every 100 feet, which provides a 4.5-dBA reduction for the first row and a 1.5-dBA reduction for every subsequent row.

[2] Interstate highways are roadways with four or more lanes that permit trucks, with traffic at 60 mph.

[3] Mainline railroad corridors typically carry 5–10 trains per day at speeds of 30–40 mph.

[4] Other roadways are parkways with traffic moving at 55 mph, but without trucks, and city streets with the equivalent of 75 or more heavy trucks per hour and 300 or more medium trucks per hour at 30 mph.

[5] No comprehensive data are available regarding the noise levels or change in ambient noise levels generated by the existing unpermitted cannabis cultivation.

Source: FTA 2006

4.10.6 Impact Analysis

This discussion describes the methodology and significance criteria that were used to analyze noise impacts of the Proposed Program. It also presents the analysis of the potential environmental impacts of the Proposed Program and presents mitigation measures to be implemented for potentially significant impacts.

Methodology

Noise

The noise analysis for the Proposed Program considered the responsibilities of local agencies in developing and implementing appropriate noise ordinances. In addition, a qualitative analysis approach was performed to consider the potential noise levels

associated with various cultivation activities. This analysis included compiling and averaging reference noise levels for potential cultivation-related operational equipment, as shown in **Table 4.10-9** and described below.

The analysis of Proposed Program noise effects included the following steps:

1. From available online information and site visits of existing cannabis cultivation operations, the pieces of electromechanical equipment or vehicles associated with a specific type of cannabis cultivation activity under the Proposed Program were presumed to be the same as equipment used in existing cannabis cultivation operations.
2. A reference maximum (Lmax) sound power or sound pressure level (in dBA) was determined or estimated for the equipment and vehicles under consideration at a specified distance (for this analysis, 50 feet) through a review of available manufacturer's data and other sources.
3. This Lmax was considered in making a determination as to whether the noise generation could be considered substantial, given the various regulatory guidance provided in the Setting section above.

Vibration

A qualitative analysis of vibration that could be generated by cultivation activities under the Proposed Program was conducted, focused on human annoyance and building damage risk vibration effects, considering the type and frequency of equipment and vehicles used during cultivation, nursery, and processing activities under the Proposed Program. The equipment that may be used under the Proposed Program with the greatest likelihood of being a substantial source of vibration emission would be a loaded truck.

Variation in Noise-generating Equipment Based on Cultivation Technique

As described in Chapter 3, *Proposed Program Activities*, cannabis cultivation license types under the Proposed Program may have similar or varying equipment needs depending on the specific nursery or cultivation activities performed, including propagation and/or processing. This discussion describes the potential equipment needs and, therefore, anticipated primary temporary and permanent noise sources for each cultivation practice. "Permanent" noise sources are considered to be equipment that, at a minimum, would likely be used daily. "Temporary" noise sources would be equipment or activities that are conducted infrequently (less than daily).

Table 4.10-9 provides noise reference levels for equipment that could be used under the various Proposed Program license types.

Table 4.10-9. Noise Reference Levels at 50 Feet from Primary Noise-generating Cannabis Cultivation Equipment

Equipment Type	Noise Reference Level at 50 feet[1] (dBA)	Potential Cultivation License Type	Potential Use Frequency[2]
Chainsaw	76.3–95.9	Outdoor	Temporary
Irrigation Pump	67.2–76.3	All	Permanent
Generator (diesel)	70.2–81.0	All	Temporary (used as a backup)
HVAC unit	56.9–69.9	All[3]	Permanent
Mower	66.3–91.9	Outdoor & Mixed-Light	Temporary
Loaded Truck	88.0	All	Temporary
Ventilation Fan	29.9–50.9	All	Permanent

Notes:

dBA = A-weighted decibels; HVAC = heating, ventilation, and air conditioning

[1] Noise levels at a distance of 50 feet from the equipment source were estimated from varying reference level distances. Manufacturer's data included in this table provide a potential range of representative noise levels for various equipment sources and are not meant to be an exhaustive list of the precise equipment that may be used by licensees under the CalCannabis Cultivation Licensing program.

[2] Permanent use is defined as the use of the equipment at least daily. Temporary use is defined for this analysis as anything that is less used frequently than daily.

[3] It is assumed that, for outdoor cultivation, this equipment would only be required for propagation activities or for outdoor cultivation occurring within an enclosed area (e.g., a greenhouse).

Sources: American Speech-Language-Hearing Association 2016; Bryant Heating and Cooling Systems 2016; FTA 2006; Global Industrial 2016a, 2016b, 2016c; Lennox 2016; Mountain Electric Bike 2016a, 2016b, 2016c; Ontario Ministry Agriculture, Food, and Rural Affairs 2015.

Significance Criteria

CEQA significance criteria were used to determine whether the Proposed Program would result in a potentially significant impact related to noise. These criteria are consistent with community noise standards published by OPR (see Table 4.10-2). Under the Proposed Program regulations (Section 8102[b][10][B]), applicants for licensing by CDFA would be required to be "in compliance with all local ordinance and regulations, including the general plan, zoning ordinances, building code standards, noise ordinances, and land use plans."

For the purposes of this analysis, based on Appendix G of the State CEQA Guidelines, the Proposed Program would result in a significant impact related to noise if it would:

A. Expose persons to or generate noise levels in excess of applicable noise thresholds or standards;

B. Expose persons to or generate excessive groundborne vibration or groundborne noise levels;

C. Cause a substantial permanent increase in ambient noise levels in the vicinity of a Proposed Program activity above levels existing without the Proposed Program;

D. Cause a substantial temporary or periodic increase in ambient noise levels in the vicinity of a Proposed Program activity above levels existing without the Proposed Program;

E. For a Proposed Program activity located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, expose people residing or working in the area of the Proposed Program activity to excessive noise levels; or

F. For a Proposed Program activity within the vicinity of a private airstrip, expose people residing or working in the area of the Proposed Program activity to excessive noise levels.

To evaluate impacts relative to Criterion A, the anticipated noise generated by the various Proposed Program activities were analyzed assuming a nearby noise-sensitive receiver and considered in the context of applicable local noise-related regulations.

The evaluation relative to Criterion B considered potential vibration-generating noise sources used under the Proposed Program and their frequency of use.

Impacts related to Criteria C and D were evaluated by considering the noise sources of Proposed Program activities, specifically, the frequency, location, and duration of use of noise-generating equipment and the potential resulting noise effects.

Criteria E and F are related specifically to the proximity of public airports and private airstrips and were qualitatively evaluated by comparing potential noise levels from airports to those generated by Proposed Program activities.

If Proposed Program activities would occur in or near a community where a local noise ordinance or similar regulation or policy exists, that ordinance, regulation, or policy may apply. The Proposed Program would not authorize licensees to violate other applicable requirements, irrespective of the conclusions of this analysis.

Environmental Impacts of the Proposed Program

General Cultivation Impacts

Impact NOI-1: Expose people or residences to excessive noise levels within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport. (Less than Significant)

General cultivation impacts include impacts of any type of cultivation activity: outdoor, mixed-light, indoor, nursery, and processing.

Although it is possible that some cannabis cultivation sites licensed under the Proposed Program may be located near existing airports or airstrips, these cultivation operations are not anticipated to expose nearby residents or workers to substantial additional noise levels beyond those already generated by the airport or airstrip. Specifically, noise-generating sources used for cultivation operations (generally temperature and climate control equipment) would not be significantly different than other climate control equipment used for other land uses. Therefore, this impact would be **less than significant**.

Impact NOI-2: Use mechanical equipment for the cultivation of cannabis resulting in generation of excessive groundborne vibration or groundborne noise levels. (Less than Significant)

With respect to groundborne vibration, a loaded truck (as listed in Table 4.10-9) is expected to have the greatest potential to generate groundborne vibration or groundborne noise. An HVAC system may also generate groundborne vibration or groundborne noise levels, but these would not be a substantial source (i.e., a detectable source on properties adjacent to a cannabis cultivation site) as long as the system is properly installed, maintained, and operated, as required by California building standards and codes. Other potential equipment types used for the various cannabis cultivation activities would not generate substantial vibration due to the type or location of the equipment or duration of equipment use, and therefore are not considered further.

The likelihood of any sensitive buildings being located close enough to the cannabis cultivation activities to cause human annoyance or building damage would be small. In addition, licensees under the Proposed Program would be required to comply with all federal, State, and local policies, rules, and regulations, including vibration criteria. Because specific operational practices would vary from site to site, it is speculative to determine that cultivation operations under the Proposed Program would generate excessive groundborne vibration or groundborne noise levels. As part of the application process, CDFA would review site-specific information to determine whether significant impacts are possible, and conduct additional CEQA review if necessary, or acting as a responsible agency on a CEQA document prepared by another lead agency (e.g., a local jurisdiction).

For these reasons, the vibration-generating impact associated with the Proposed Program's activities would be **less than significant**.

Impact NOI-3: Use of mechanical equipment for the cultivation of cannabis resulting in a substantial permanent increase in ambient noise levels in the vicinity of a Proposed Program activity above levels existing without the Proposed Program. (Less than Significant)

Some types of cultivation-related equipment would be used on at least a daily basis (if not more frequently); these are identified as permanent noise sources in Table 4.10-9. These permanent noise sources could result in a substantial permanent increase in ambient noise levels. Residents in less-developed areas are the most sensitive noise receptors for these sources, as noise from adjacent cannabis cultivation activities may be the only significant human-caused noise sources affecting these properties. The degree to which sound reaches residents from adjacent areas depends on a number of factors, including the type and location of activity being conducted, distance to residence, intervening vegetation topography, the building materials of the home, and other factors.

Because of the variability in local noise standards and the fact that specific operational practices would vary from site to site, it is speculative to conclude that cultivation operations under the Proposed Program would frequently generate excessive noise for sensitive receptors or a substantial permanent increase in ambient noise levels, and all cultivators would be required to comply with applicable local noise ordinances or policies. In urban areas, the local jurisdiction typically develops strict noise ordinances that would be applicable to all development and operational activities within its jurisdiction, including

commercial cannabis cultivation operations. Rural areas would be less likely than urban areas to have large indoor operations with noisy HVAC systems, although irrigation pumps would be a common noise source.

As part of the application process, CDFA would consider site-specific information such as the equipment to be used, noise levels generated, timing of use, and location of nearby sensitive receptors, as well as factors such as intervening topography, screening, and enclosures (such as buildings) within which the noise may be contained, the local noise standards or ordinance, and whether the activity is new or ongoing (in which case it is part of the baseline condition). To the extent that significant impacts are possible at a site-specific level that have not been considered in this PEIR, a site-specific CEQA document would be required, for instance as part of the approval process undertaken by the local agency and/or other responsible agencies (including, potentially, CDFA).

Therefore, because significant impacts are generally not anticipated, and any significant impacts would be addressed through additional CEQA documentation, this impact is considered **less than significant**.

Impact NOI-4: Use mechanical equipment for the cultivation of cannabis resulting in excessive noise for sensitive receptors, and/or resulting in a substantial temporary or periodic increase in ambient noise levels. (Less than Significant)

Cannabis cultivation operations typically require the use of noise-generating equipment, such as that indicated in Table 4.10-9. The level of noise generated is related to the size, type, and amount of equipment being used; the location of the equipment (within or outside of a building); frequency of equipment use; and operating condition of the equipment. For example, the quietest ventilation fan would also be the most efficiently operating fan (Buffington et al. 2002). The specific equipment needs for individual cannabis cultivation activities are dependent on a variety of factors, including the size and design of cannabis cultivation areas (including greenhouses), the local climate conditions, and the type of cultivation activities.

Temporary noise levels of potential cannabis cultivation equipment to be used under the Proposed Program would potentially exceed applicable noise standards. However, some of these activities would be very infrequent. For instance, chainsaws would likely only be needed at the end of the cannabis harvest season to cut down large cannabis stalks, and mower usage around the cultivation site would be infrequent as well. Chainsaw and mower usage would be particularly unlikely at night when noise generation would be of most concern to nearby sensitive receptors. Other potential cannabis cultivation activities, such as using dogs for security purposes, hand application of nutrients or water to cannabis plants, processing (trimming), propagation, inspection, track and trace, enforcement, or similar activities, would likely only require hand-held tools or temporary vehicle use, and are not expected to generate substantial noise. Therefore, these types of activities are not considered further.

As shown in Table 4.10-7, the standards contained in cannabis-related ordinances vary considerably within each jurisdiction, some of which are entirely qualitative or exclude agricultural operations. Similarly, city and county general plan noise elements and/or noise ordinances, which may also be applicable to cannabis cultivation activities, are also highly variable. In general, these sources are intended to provide land use compatibility guidelines

and locally acceptable standards; they differ across local jurisdictions based on factors such as zoning, proximity to sensitive receptors or sensitive areas (e.g., low ambient noise environments such as timberlands), or the time of day during which activities occur (defined daytime vs. nighttime periods). The potential for a particular cultivation operation licensed under the Proposed Program to exceed the significance thresholds depends on the local ordinances applicable to the particular site and the numerous other factors (e.g., equipment use/type/frequency) described previously.

In general, because of the infrequent nature of many of these activities, impacts would typically not be substantial. However, because of the variability in local noise standards and the fact that specific operational practices would vary from site to site, it is possible that certain cultivation operations could generate temporary or periodic increases in noise above ambient levels at the location of the nearest sensitive receptor which could be substantial. As part of the application process, CDFA would consider site-specific information such as the equipment to be used, noise levels generated, timing of use, and location of nearby sensitive receptors, as well as factors such as intervening topography, screening, and enclosures (such as buildings) within which the noise may be contained, the local noise standards or ordinance, and whether the activity is new or ongoing (in which case it is part of the baseline condition). To the extent that significant impacts are possible at a site-specific level that have not been considered in this PEIR, a site-specific CEQA document would be required, for instance as part of the approval process undertaken by the local agency and/or other responsible agencies (including, potentially, CDFA).

Because impacts would generally be infrequent and therefore not substantial, significant impacts are not anticipated, and any significant impacts would be addressed through additional CEQA documentation, this impact is considered **less than significant**.

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4.11 Public Services

4.11.1 Introduction

This section of the Program Environmental Impact Report (PEIR) presents the environmental setting and potential impacts of the California Department of Food and Agriculture's (CDFA's) CalCannabis Cultivation Licensing program (Proposed Program) related to public services. Information regarding public services presented in this section is primarily based on the following sources:

- Peer-reviewed studies of the effects of cannabis laws on crime and public services;
- White papers on crime, fire, and related effects of cannabis cultivation and associated activity;
- News articles of crime and fire incidents involving cannabis cultivation; and
- Agency websites and fact sheets.

4.11.2 Regulatory Setting

Federal Laws, Regulations, and Programs

No federal laws, regulations, or programs were identified related to public services and the Proposed Program. Several federal agencies have jurisdiction over law enforcement and fire protection on federal lands in California, related to unpermitted cultivation operations. The U.S. Forest Service (USFS) responds to fires in National Forests as well as to fires on other lands in support of other federal, state, and local agencies (USFS 2016). Because cannabis use and cultivation remains illegal under federal law, several federal agencies investigate and prosecute cannabis use, cultivation and distribution on federally managed lands. Federal agencies involved in law enforcement in California include the USFS, whose Law Enforcement and Investigations (LEandI) division conducts law enforcement operations on federal lands, including eradication of unpermitted cannabis cultivation on National Forest lands. Both the Bureau of Land Management (BLM) and the National Park Service (NPS) law enforcement programs target cannabis cultivation on federally managed lands.

In addition to law enforcement on federal lands, there are federal agencies that investigate and prosecute cannabis business activities generally. The Federal Bureau of Investigation (FBI), as the nation's foremost law enforcement agency, also works in California to investigate federal crimes and crimes that occur across state lines, including drug trafficking. The U.S. Drug Enforcement Administration (DEA) enforces federal controlled substances laws and regulations, including enforcement activities related to cannabis.

State Laws, Regulations, and Programs

California Building, Electrical, and Fire Codes

The California Building Standards Code, Title 24 of the California Code of Regulations (CCR), serves as the basis for the design and construction of buildings in California. The California Building Code (Title 24, Part 2) covers all aspects of building design and required safety

features for all types of buildings, including fire protection systems, fire and smoke protection features, means of egress, and structural design and materials. Title 24, Part 3 is the Electrical Code, which contains standards for electrical systems, including safety features such as overcurrent protection, surge arresters, and proper wiring methods.

Title 24, Part 9 is the California Fire Code. This portion of the code contains requirements related to emergency planning and preparedness, fire service features, building services and systems, fire-resistance-rated construction, fire protection systems, and construction requirements for existing buildings, as well as specialized standards for specific types of facilities and materials.

California Public Resources Code, Division 4, Part 2: Protection of Forest, Range, and Forage Lands

Division 4, Part 2 of the California Public Resources Code (PRC) contains requirements for structures and land uses with respect to prevention and control of forest fires. PRC Section 4291 requires that any person who owns or operates a structure in a mountainous area or brush-covered lands shall at all times maintain defensible space[1] of 100 feet from each side and from the front and rear of the structure.

Fire Protection and State Responsibility Area

The California Department of Forestry and Fire Protection (CAL FIRE) provides fire suppression and emergency response services within the State Responsibility Area (SRA) of the state, as defined in PRC Sections 4125-4128. The SRA is the area within which the State of California has the primary financial responsibility for the prevention and suppression of wildland fires. The SRA forms an area of more than 31 million acres.

The SRA Fire Prevention Fee was enacted following the signing of Assembly Bill X1 29 in July 2011. The law approved the new annual fee to pay for fire prevention services within the SRAs. The fee is applied to all habitable structures within the SRAs. Owners of habitable structures that are also within the boundaries of a local fire protection agency receive a fee reduction.

Law Enforcement

Several State agencies provide law enforcement services within specified jurisdictions in California. The California Department of Fish and Wildlife (CDFW) has game wardens who are responsible for enforcing its regulations, including hunting, fishing, and firearms laws and eradication of unpermitted "trespass grows," where cannabis cultivators trespass on public lands to grow cannabis without permission or permits. State park rangers provide law enforcement within State parks. The California Highway Patrol (CHP) is responsible for enforcing vehicular and traffic laws on state highways and freeways, regulating the transport of goods, and serving as emergency responders to incidents on the state's highway system.

[1] Defensible space is generally defined as the natural and landscaped area around a structure that has been maintained and designed to reduce fire danger, such as through fire-resistant plant selection and pruning.

Local Laws, Regulations, Plans, and Policies

Currently, local laws and regulations governing cannabis cultivation are highly variable across different counties and cities in California. In some counties, cannabis cultivation is permitted for large-scale commercial and personal use, whereas in other counties it is only permitted on a limited basis for personal use.

In areas where commercial cannabis cultivation is permitted, many jurisdictions impose restrictions on cultivation activities to limit possible environmental impacts, including those on public services. For example, some counties require that cannabis cultivation facilities implement security measures (e.g., locked and enclosed cultivation spaces, perimeter alarms) to deter crime. Many counties also limit the wattage of lights used in indoor cultivation and/or require that indoor cultivation facilities obtain all applicable electrical and building permits to limit the potential for electrical fires in indoor cultivation facilities.

See **Appendix E** for a summary of existing and proposed local commercial cannabis ordinances in California, including provisions designed to limit impacts on public services.

4.11.3 Environmental Setting

Fire Protection and Emergency Services

Fire protection and emergency services are provided throughout California in a patchwork of service areas under local, State, federal, and tribal agency jurisdiction. Timber owners also may provide firefighting services. In many instances, agencies work together, particularly in response to large fires or emergencies that require more resources than the primary responding agency can provide.

Local Government Fire Departments

In most areas of the state where cannabis cultivation could occur under the Proposed Program, fire protection would primarily be the responsibility of the local city or county fire department. The resources of these local fire departments vary throughout California. Generally, large city fire departments have greater resources (i.e., personnel, apparatus, fire stations) but also serve much larger populations and receive many more calls for service. Rural and county fire departments often have fewer resources than large city departments, serve smaller populations, and are spread out over a greater land area. City and county departments may work in collaboration with state and federal agencies to prevent and fight fires in the urban-wildland interface.

Local fire department staffing and resources are typically planned in accordance with applicable general plans to ensure that acceptable response times and service ratios are maintained.

State and Federal Fire Protection Agencies

As described above, several state and federal agencies provide fire protection services in California. CAL FIRE provides fire suppression and emergency response services in the SRA portion of the state. CAL FIRE also contracts with local jurisdictions to provide fire protection services to non-state lands. In addition to fire protection, CAL FIRE responds to

needs for medical aid, hazardous material spills, swiftwater rescues, search and rescue missions, civil disturbances, train wrecks, floods, and earthquakes (CAL FIRE 2012).

The USFS responds to fires in National Forests as well as to fires on other lands in support of other federal, state, and local agencies (USFS 2016).

Police Protection

Police protection is provided in California by various local, state, federal, and tribal agencies. It is anticipated that, in most instances, police protection services related to cannabis cultivation activities under the Proposed Program would be provided by local city and county departments. In certain instances, State or federal agencies may be called in to assist with an investigation or enforcement activity.

Currently, state and federal agencies such as CDFW and USFS law enforcement divisions, described further below, are extensively involved in abatement of unpermitted cannabis cultivation and/or trespass grows on State and federal lands. However, these activities are considered as wholly separate from the Proposed Program, which would only authorize lawful cannabis cultivation on private land. Trespass grows and unpermitted cannabis cultivation may continue to occur after the Proposed Program is implemented, requiring responses from law enforcement and other relevant agencies, but these activities would not be authorized by the Proposed Program.

Local Government Police Departments

In unincorporated areas within California, police protection service is typically provided by the county sheriff's department. These county departments often cover large, sparsely populated areas and, therefore, have longer response times for their service areas than their city counterparts. Incorporated areas of the state are generally served by city police departments. Depending on the populations served, prevailing crime rates, and other factors, these police departments may have a large number of staff and equipment, or may have less need for resources in response to fewer calls for service.

Similar to local government fire departments, police departments are typically staffed in accordance with standards for response time and service ratios specified in the general plan. Jurisdictions also may impose an impact fee on new development to cover the cost of providing necessary public services, including police protection.

State and Federal Law Enforcement Agencies

Various state agencies provide law enforcement services in California. As noted above, CDFW's game wardens have been extensively involved in eradicating unpermitted trespass grows" on State lands. CDFW also enforces hunting, fishing, and firearms laws. The California Highway Patrol (CHP) is the statewide law enforcement agency responsible for enforcing vehicular and traffic laws on state highways and freeways regulating the transport of goods; and serving as emergency responders to incidents on the state's highway system.

Federal agencies involved in law enforcement in California include the USFS, whose Law Enforcement and Investigations (LEandI) division conducts law enforcement operations on federal lands, including eradication of unpermitted cannabis gardens on National Forest

lands. BLM and NPS also have law enforcement divisions that target cannabis cultivation on federally managed lands. The FBI, as the nation's foremost law enforcement agency, also works in California to investigate federal crimes and crimes that occur across state lines, such as unpermitted drug trafficking. DEA investigates crimes related to the federal Controlled Substances Act, including those related to any production of Schedule 1 substances (e.g., cannabis).

Schools

School districts in California are funded by a combination of State and local or tribal governments. School standards are often described in general plans, which may specify acceptable student-to-teacher ratios and other metrics for determining whether new or upgraded facilities are needed. School districts are independent jurisdictions in California, however; they have the ability to raise funds through bond measures and make decisions about their facilities and services without input from local governments.

Parks

Parks are provided throughout the state largely by local and tribal governments. Generally, local and regional parks are provided consistent with general plan goals and policies, which often articulate desired quantities and types of parkland per number of residents.

State and national parks, forests, and monuments are also located throughout the state. These areas are managed by the applicable State and federal agencies. Most state-designated recreational properties are operated by the California Department of Parks and Recreation; federal properties are controlled by USFS, BLM, and (for recreational water bodies) the U.S. Bureau of Reclamation. State and federal resource agencies (i.e., CDFW and USFWS) also have responsibility over management of those resources within parks and recreation areas.

Other Public Services

Other public services include hospitals, libraries, and community centers. These facilities are distributed throughout the state, generally in proportion to population.

4.11.4 Impact Analysis

This section describes the methodology and significance criteria that are used to analyze public service impacts. It then presents the analysis of the potential environmental impacts of the Proposed Program.

Methodology

Potential impacts on public services have been evaluated qualitatively by considering various aspects of the Proposed Program in light of the California Environmental Quality Act (CEQA) Guidelines Appendix G significance criteria (listed below) and the existing regulatory and environmental setting (described above). Identified potential impacts are not considered significant unless they would result in changes to the physical environment that would trigger one of the CEQA significance criteria listed below.

As noted throughout this PEIR, this analysis only considers the environmental impacts of licensed cannabis cultivation activities conducted in accordance with the Proposed Program. The impacts of trespass grows and other unpermitted operations are considered outside the scope of the Proposed Program. Nevertheless, because cannabis cultivation in California to date has been conducted largely within the black market, much of the information available on the impacts of cannabis cultivation has focused on unpermitted operations. This information is discussed to the extent that it may inform the analysis of potential impacts under the Proposed Program but is not intended to indicate that unpermitted activities may be authorized under the Proposed Program.

Significance Criteria

For the purposes of this analysis, based on Appendix G of the State CEQA Guidelines, the Proposed Program would result in a significant impact related to public services if it would:

A. Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of these public services:

    1. Fire protection
    2. Police protection
    3. Schools
    4. Parks
    5. Other

Note that potential hazards to firefighters and first responders associated with indoor cannabis cultivation operations are evaluated in Section 4.7, *Hazards, Hazardous Materials, and Human Health.*

Environmental Impacts of the Proposed Program

General Cultivation Impacts

Impact PS-1: Cause a substantial adverse impact related to police protection services. (Less than Significant)

General cultivation impacts include impacts of any type of cultivation activity: outdoor, mixed-light, indoor, nursery, and processing.

An elevated risk of crime associated with cannabis cultivation operations has been a concern raised in scoping and noted in the literature (California Police Chiefs Association 2009; Garmire 2009).

In Colorado, where cannabis was legalized for recreational use in 2012, dispensaries have faced frequent robbery and burglary attempts despite requirements to install alarms and surveillance cameras (Dokoupil and Briggs 2014). Likewise, the Police Foundation (2015) reports that burglary rates at licensed cannabis facilities in Colorado are much higher than at other retail outlets, such as liquor stores. The report found that 13 percent of Denver's

licensed cannabis facilities experienced burglaries in 2012 and 2013, compared with 2 percent of liquor stores.

This risk may be driven by several factors, including the fact that cannabis continues to be extremely valuable and, therefore, is a target for would-be robbers. According to Forbes (2015), the retail price of cannabis (note that the report did not distinguish between cannabis grown for medical or nonmedical use) in California is approximately $242 per ounce, equating to $3,872 per pound. This could translate to millions of dollars in product present at any given time at a commercial cultivation facility.

Also, currently, federally insured banks are mostly unwilling to service the cannabis industry due to continued federal prohibition. This means that cannabis-related organizations or businesses are forced to deal in cash, subjecting them to a substantially increased risk for crime.

Research conducted for this PEIR revealed a number of armed robberies and related crimes that have occurred at cultivation operations in California and around the country (**Table 4.11-1**). It should be noted, however, that many of these incidents involved unpermitted cultivation activities whose operations and security protocols may differ from licensed cultivation operations under the Proposed Program. Many of the cultivation sites victimized by crime shown in Table 4.11-1 may not have implemented proper security measures, or may have attracted criminals simply by their unpermitted nature. On the other hand, robberies and other crimes targeting unpermitted operations may often go unreported due to the cultivator's fear of prosecution for being an unlawful operation. These factors, along with uncertainty regarding the total number of existing cannabis cultivation operations in California today, make it difficult to determine whether the incidents listed in Table 4.11-1 represent a large or small percentage of operations subjected to crime.

All of the incidents listed in Table 4.11-1 received a response from one or more law enforcement agencies and emergency responders, potentially temporarily decreasing their availability to respond to other calls for service. That said, none of the literature reviewed indicated that these incidents, on their own, required construction of new or expanded police facilities.

Additionally, while the incidents described in Table 4.11-1 support the idea that cannabis cultivation may have an elevated potential for crime, some studies have shown an opposite or contrasting effect. Morris et al. (2014) evaluated the effect of medical cannabis laws on crime in states that have approved the use of medical cannabis. After controlling for various sociodemographic factors, the study found that the implementation of laws allowing cultivation and business activities related to medical cannabis were not predictive of higher crime rates and may be related to reductions in rates of homicide and assault (Morris et al. 2014). Similarly, Kepple and Freisthler (2012) evaluated the relationship between medical cannabis dispensaries and crime, based on location, and found no relationship between the two. The results suggest that measures such as surveillance cameras and private security services may act as effective deterrents to crime.

On balance, the information contained in the literature and from available news stories suggests that cannabis cultivation is potentially at elevated risk for crime; however, an

elevated risk of crime is not a significant impact under CEQA unless it can be tied to a physical impact on the environment.

Table 4.11-1. Reported Armed Robberies and Related Crimes at Cannabis Grow Operations

Location	Type of Crime(s) Committed	Type of Grow Operation	No. of Plants	No. of Injuries or Deaths	Citation
Amador County, CA	Homicide, Armed Robbery	Indoor and outdoor, at residence	779	1 victim killed	Nichols 2011
Fresno County, CA	Armed Robbery, Kidnapping	Indoor, at residence	150	2 suspects killed in gun battle	Kemp 2014
Fresno County, CA	Armed Robbery	Outdoor, at residence	200	1 suspect killed when run over by pickup truck during altercation	Rose 2015
Riverside County, CA	Armed Robbery	At residence, unknown if indoor or outdoor	N/A	None	O'Neill 2015
Sacramento, CA	Homicide	Indoor, at residence	100s	1 dead	Chang 2016
San Francisco, CA	Armed Robbery, Kidnapping	Indoor, at commercial building site	1,000	None	Aldax 2013
San Lorenzo, CA	Attempted Burglary	Indoor, at residence	200	Minor injuries to the victim	Kirschenheuter 2015
South Sacramento, CA	Robbery	Indoor, at residence	N/A	None	Johnson 2016
Tehama County, CA	Homicide, Armed Robbery	At residence, unknown if indoor or outdoor	N/A	1 victim killed	KRCR Staff 2013
Canon City, CO	Armed Robbery	Indoor, at residence	N/A	Victim bruised, suspect believed to be shot	Ray 2015
Denver, CO	Attempted Home Invasion	Indoor, at residence	N/A	Suspect shot	Hickey and Hooley 2015
Hialeah, FL	Armed Robbery, Kidnapping	Indoor, at residence	N/A	Victim beaten	NBC 6 South Florida 2015
Bellevue, WA	Armed Robbery	Indoor, commercial store-front	N/A	None	Macz 2015

As described in Chapter 2, *Proposed Program Description,* the Proposed Program would require that applicants for cannabis cultivation licenses must comply with all regulations and ordinances of the local jurisdiction, including those related to commercial cannabis cultivation, as well as any other applicable regulations and ordinances. As shown in

Appendix E, some local jurisdictions already require commercial cannabis cultivators to implement security measures, such as video surveillance and alarm systems, to prevent unlawful diversion of cannabis and to deter crime. These measures are anticipated to reduce robbery and burglary attempts to some degree; although, as Dokoupil and Briggs (2014) report, these types of measures are not necessarily sufficient to deter all crime, as evidenced by Colorado's experience.

Considering the ongoing nature of many operations that would likely seek licensing under the CalCannabis Cultivation Licensing program, there is reason to believe that implementation of the Proposed Program may decrease pressure on police protection resources. Under existing conditions, police throughout the state are spending considerable time and resources dealing with cannabis cultivation–related issues, such as investigating and abating unpermitted grow houses, and detecting and eradicating unpermitted trespass grows on state and federal lands. With the Proposed Program, it is reasonable to assume that some of the cultivators not currently operating in compliance with local requirements would apply for local approval and become lawful businesses, reducing the enforcement needs for these operations. With a legal pathway for cannabis cultivation and increased supply of legally grown cannabis, there also may be less opportunity or incentive for criminal organizations to introduce black market product into the supply chain, thus decreasing the need for police resources to address these issues. The track-and-trace system, by creating a mechanism for tracing cannabis products, would further impede interference by the black market in lawful cannabis commerce.

In areas of California that would experience a large number of new cannabis cultivation businesses under the Proposed Program, it is possible that existing police protection services could be strained to provide resources beyond their existing capacities. However, CDFA does not possess information, nor can it speculate, as to where such growth could trigger the need for new or additional police facilities.

In summary, while some crime associated with licensed cannabis cultivation activities is likely to continue, no information has been found that indicates that the Proposed Program would increase law enforcement needs overall compared to baseline conditions. If anything, demand may decrease due to a larger number of lawful cultivators and their coordination and cooperation with law enforcement authorities. Furthermore, linking any increase in demand for law enforcement to a need for new or additional police facilities in any particular location, the construction of which could cause significant environmental effects, is speculative. Such requirements would need to be addressed by law enforcement agencies on a case-by-case basis, and the agency undertaking the development of any new or expanded facilities would be required to comply with CEQA to address potentially significant impacts. Therefore, this impact would be **less than significant**.

Impact PS-2: Cause a substantial adverse impact related to schools. (Less than Significant)

Under the Proposed Program, CDFA would not license cultivation sites within 600 feet of schools, reducing the potential for conflicts with school operations. As such, it is considered unlikely that new or altered school facilities (for example, relocations of schools) would occur as a result of licensed cannabis operations being located near schools. In addition, planning efforts and permitting decisions by local government (related to commercial

cannabis cultivation or otherwise) should help address any potential for siting conflicts or inconsistencies.

Based on the analysis provided in the SRIA (ERA Economics 2017), the CalCannabis Cultivation Licensing program would not result in substantial population growth, and as such would be unlikely to increase demand for schools in any particular location to the extent that it would necessitate new or altered school facilities, the construction of which could cause significant impacts. Such requirements would need to be addressed by local jurisdictions on a case-by-case basis, and the agency undertaking the development of any new or expanded schools would be required to comply with CEQA to address potentially significant impacts. Therefore, this impact would be **less than significant**.

Impact PS-3: Cause a substantial adverse impact related to parks or other public services. (Less than Significant)

The Proposed Program is not expected to cause direct adverse impacts to parks or other public facilities. While unpermitted cultivation operations are known to occur on public lands used for recreation, such operations would not be licensed under the Proposed Program. If anything, implementation of the Proposed Program may reduce such trespass grows, as creation of a licensed pathway for cannabis cultivation may decrease incentive for criminals to grow cannabis on park lands.

In addition, as described in Impact PS-2, the CalCannabis Cultivation Licensing program is not anticipated to result in substantial population growth such that demand for parks or other public facilities in any particular location would necessitate new or altered facilities, the construction of which could cause significant impacts. Such requirements would need to be addressed by relevant government agencies on a case-by-case basis, and the agency undertaking the development of any new or expanded facilities would be required to comply with CEQA to address potentially significant impacts. Therefore, this impact would be **less than significant**.

Outdoor Cultivation

Impact PS-4: Cause a substantial adverse impact related to fire protection services from outdoor cultivation. (Less than Significant)

Outdoor cultivation activities would have the potential to generate calls for fire protection service. As described in Chapter 2, *Proposed Program Description,* outdoor cultivation sites may be located in forested areas and/or areas designated Extremely High Fire Hazard Severity Zones. As described in Impact HAZ-7 in Section 4.7, *Hazards, Hazardous Materials, and Human Health,* outdoor cultivation could involve uses that would generate fire risk (e.g., storage and use of flammable materials, use of power equipment), but this risk would not be substantially different from that posed by other agricultural operations that use similar equipment and practices, and would not be substantial.

In general, it is expected that most local jurisdictions would incorporate the need for adequate fire protection services into their planning efforts—related to cannabis cultivation or otherwise—such as through their general plans and/or impact development fee processes.

No information has been found to suggest that the Proposed Program would increase fire protection needs overall compared to baseline conditions. A reduction in unpermitted cultivation sites may lead to improved provision of fire protection, considering that the locations of sites will be known. Furthermore, linking the Proposed Program to any increase in demand for fire protection and to a need for new or additional facilities in any particular location, the construction of which could cause significant environmental effects, is speculative. Such requirements would need to be addressed by fire protection agencies on a case-by-case basis, and the agency undertaking the development of any new or expanded fire protection facilities would be required to comply with CEQA to address potentially significant impacts. Therefore, this impact would be **less than significant**.

Indoor Cultivation

Impact PS-5: Cause a substantial adverse impact related to fire protection services from indoor cultivation. (Less than Significant)

An elevated risk of fire associated with indoor cannabis cultivation is a commonly cited concern in the literature (California Police Chiefs Association 2009). As described in Chapter 3, *Proposed Program Activities,* indoor cannabis cultivation typically involves use of high-intensity grow lights, as well as various other pieces of equipment (e.g., water pumps, humidity control, temperature control), which can create a relatively large electrical load. If the load exceeds the system capacity (e.g., as may occur in a building without appropriate or updated wiring for use in cannabis cultivation), it could result in an electrical fire.

Research conducted for the PEIR revealed reports in various parts of California and other states of house fires or other structure fires caused or suspected of being caused by indoor cannabis cultivation operations. Examples of such incidents are provided in **Table 4.11-2**. Most of these fires occurred at residences, typically with faulty or unpermitted wiring as the primary cause. It bears noting that many of these incidents involved unpermitted cultivation operations, stolen electricity, and/or electrical systems that were not in compliance with building, electrical, and fire codes considering the electrical load of the equipment being used. Cultivators licensed under the Proposed Program would be required to obtain electricity legally and use facilities that meet applicable codes, and have any electrical upgrades performed by a licensed electrician, and so these past incidents are not necessarily indicative of what may occur under the Proposed Program.

As described by Lompoc Fire Department Chief Kurt Latipow, the problem with indoor cannabis cultivation in residential buildings is that the residential electrical system is typically constructed to accommodate a very specific electrical power demand that is based on appliances, lighting, and other electrical applications associated with residential uses (Minsky 2015). For example, an average bedroom may share a 15-amp circuit with another room, meaning that the wire is able to safely handle 15 amps of electricity at a time. If this room is used to grow cannabis, a 1,000-watt grow light will require a little more than 9 amps to operate, leaving only 6 amps for all other equipment (Brahe 2016). When 100 watts are added for a circulating fan and 60 watts for an external light source, this may consume the entire available 15 amps. Any time the capacity of the electrical circuit is exceeded or more current is allowed to flow across lines than they were designed to accommodate, heat is generated and fire risk increases.

As a result of the high electrical load of indoor cannabis cultivation operations, and often because of unpermitted or suspect wiring in unlicensed facilities, there has historically been a high fire rate at these facilities. One article estimated that the likelihood of fire in a grow operation is 40 times greater than in a private dwelling (La Barge and Noakes 2015). This article asserted that in Ontario, Canada, during 2001 and 2002, 4 percent of grow operations experienced fire (La Barge and Noakes 2015).

Table 4.11-2. Fires Caused or Suspected of Being Caused by Indoor Cannabis Cultivation Operations

Location	Type of Structure	Known or Suspected Cause	No. of Plants	Injuries or Deaths	Citation
Elk Grove, CA	Residence	Faulty wiring	Two rooms full	None	Hickey 2015
Felton, CA	Residence	Suspected electrical malfunction	N/A	None	Baxter 2012
Fresno, CA	Apartment	Overloaded wiring, illegal electrical tap	400	N/A	*The Fresno Bee* 2016
Lompoc, CA	Residence	Overheated electrical wire	N/A	None	Minsky 2015
San Diego, CA	Residence	Bulb in heat lamp fell from ceiling onto plants	100s	None	Kucher 2016
Santa Monica, CA	Residence	Faulty wiring	N/A	Two injured	Orzeck 2011
Colorado Springs, CO	Residence	Overloaded electrical wiring	25	None	Durbin 2016
Brandon, FL	Residence	Illegal electrical tap	31	None	10News Staff, WTSP 2016
Grand Rapids, MI	Residence	Not indicated specifically	N/A	Two injured, one critically	Tunison 2016
Las Vegas, NV	Residence	Faulty wiring	100	None	Bertolaccini 2016
Buffalo, NY	Residence	Suspected electrical wiring	N/A	One dead, one injured	Besecker 2016a, 2016b
Walworth, NY	Residence	Electrical	40-50	None	WHEC TV 2016

Again, however, many indoor cultivation sites have historically been unpermitted operations that have often used illegal or suspect wiring techniques to subvert electric metering systems and/or evade detection. Therefore, it may be presumed that the fire rates described above are not inherent to all indoor cannabis cultivation operations, but rather are indicative of the hazards associated with unpermitted indoor cultivation and noncompliance with building and electrical codes.

To ensure that electrical systems in buildings used for cannabis cultivation are capable of handling the electrical loads associated with cultivation, the Proposed Program would require that the applicant meet all relevant state and local codes and requirements,

including those of the building and electrical codes, and the proposed regulations require that modifications to electrical systems be performed by a licensed electrician.

In addition, some jurisdictions may limit the wattage or number of grow lights used in indoor cultivation operations and/or impose other requirements that serve to limit potential for electrical fires. Finally, emerging technologies such as LED lighting have greatly reduced electrical loads and levels of heat generation, reducing the potential fire risk.

In conclusion, licensed operations would be anticipated to have a substantially reduced risk of fire compared to baseline conditions. Indoor cultivation inside a residence may present unique challenges, but compliance with building and electrical codes would adequately address fire risk, and thereby prevent the need for construction of any additional fire protection facilities. Therefore, this impact would be **less than significant**.

Mixed-Light Cultivation

Impact PS-6: Cause a substantial adverse impact related to fire protection services from mixed-light cultivation. (Less than Significant)

Potential impacts related to fire protection services from mixed-light cultivation activities would be similar to those described for outdoor cultivation in Impact PS-4 and indoor cultivation in Impact PS-5. As described in Chapter 3, *Proposed Program Activities,* mixed-light cultivation involves use of similar types of equipment to those involved in both indoor and outdoor cultivation operations.

The same compliance requirements would apply to mixed-light operations as those described for indoor and outdoor cultivation operations. Therefore, as with the afore-mentioned impacts, with implementation of environmental protection measures included in the Proposed Program regulations, this impact would be **less than significant**.

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4.12 Transportation and Traffic

4.12.1 Introduction

This section of the Program Environmental Impact Report (PEIR) presents the environmental setting and potential impacts of the California Department of Food and Agriculture's (CDFA's) CalCannabis Cultivation Licensing program (Proposed Program) related to transportation and traffic. Impacts on transportation and traffic under the California Environmental Quality Act (CEQA) are generally related to conflicts with applicable circulation plans and congestion management plans, and/or addition of vehicle trips sufficient to substantially reduce roadway operating conditions. CEQA also requires consideration of air traffic and safety issues.

Information regarding transportation and traffic presented in this section is primarily based on white papers produced by law enforcement organizations regarding potential impacts on transportation and traffic from cannabis cultivation and cannabis businesses.

4.12.2 Regulatory Setting

Federal Laws, Regulations, and Programs

Federal Aviation Administration

Under Title 14 of the Code of Federal Regulations (CFR), Part 77.9, projects must notify the Federal Aviation Administration (FAA) of structural construction or alteration that involves the following:

- Any construction or alteration that is more than 200 feet above ground level;
- Any construction or alteration located at specified distances from an airport runway, at heights determined based on slope ratios identified in 14 CFR Part 77.9(b);
- Any highway, railroad, or other traverse way that, if adjusted upward by specified vertical distances, would exceed a standard identified in 14 CFR Part 77.9(a) or (b); or
- Any construction or alteration on airports and heliports, as described in 14 CFR Part 77.9(d).

Federal Highway Administration

The Federal Highway Administration (FHWA), an agency of the U.S. Department of Transportation, provides stewardship over the construction and preservation of the nation's highways, bridges, and tunnels (FHWA 2017). FHWA also conducts research and provides technical assistance to State and local agencies in an effort to improve safety, mobility, and livability and to encourage innovation in these areas (FHWA 2017).

State Laws, Regulations, and Programs

California Department of Transportation

The California Department of Transportation (Caltrans) manages the state highway system and ramp interchange intersections. Caltrans is also responsible for highway, bridge, and rail transportation planning, construction, and maintenance. Caltrans requires transportation permits for the movement of vehicles or loads exceeding the limitations on the size and weight contained in Division 15, Chapter 5, Article 1, Section 35551, of the California Vehicle Code.

Local Laws, Regulations, Plans, and Policies

Local Cannabis Ordinances Addressing Traffic

At the time of writing this Draft PEIR, local laws and regulations related to cannabis cultivation are variable across California. Some counties and cities allow commercial production of cannabis, whereas other jurisdictions permit cultivation only for limited personal use and others prohibit cultivation entirely.

In jurisdictions that allow cannabis cultivation, local ordinances often specify requirements to prevent possible environmental impacts. With respect to transportation and traffic, various jurisdictions (e.g., Humboldt, Modoc, Napa, Nevada, Shasta, and Yuba Counties and the Cities of San Jose, Sacramento, and Oakland) require that cultivation must not cause any adverse impacts or effects associated with traffic.

Los Angeles County additionally requires that medical cannabis businesses must be separated from residential zones by a public thoroughfare with a minimum roadway width of 80 feet (Ordinance Nos. 182, 580).

Appendix E contains a summary of existing and proposed local commercial cannabis cultivation regulations in California.

Other Relevant Local Plans and Policies

In general, city and county general plans contain circulation elements that include goals and policies related to transportation and traffic. Many jurisdictions and regional transportation agencies also produce congestion management plans. The standards set by local plans are highly variable with respect to measures of acceptable traffic conditions. What is considered acceptable delay in a dense urban environment may not be acceptable in a rural environment. Although a comprehensive review of such policies is beyond the scope of this statewide PEIR, these plans may include provisions that would be relevant to cultivation operations.

4.12.3 Environmental Setting

California Transportation Network

Cannabis cultivation operations would involve deliveries of materials and employee vehicle trips on all types of roads throughout the state. Note that transportation of cannabis

products requires a transporter license issued by the Bureau of Marijuana Control, which is a separate process and not a part of the Proposed Program.

Many cultivation sites in rural areas may be located near low-volume rural highways and roads, and/or may be accessed by dirt or gravel roads. By contrast, cultivation sites in urban or developed areas may be located near streets with higher traffic volumes, congested areas, and highway systems.

Existing traffic conditions in California vary on a regional, local, and (in many cases) site-specific basis. In general, areas of the state that experience high levels of traffic congestion are major metropolitan areas where population and commercial centers are located, such as the San Diego, Los Angeles, San Francisco, and Sacramento areas. The North Coast of California, which includes the Emerald Triangle (i.e., Trinity, Mendocino, and Humboldt Counties), one of the largest cannabis-producing regions of the state, is sparsely populated compared to other areas and, therefore, has fewer ongoing traffic congestion issues.

Airports and private airstrips are widely distributed throughout the State.

Figure 4.12-1 shows major state and federal highways in California.

4.12.4 Impact Analysis

This discussion describes the methodology and significance criteria that were used to analyze transportation and traffic impacts. It then presents the analysis of the potential environmental impacts of the Proposed Program.

Methodology

Traffic impacts that would result from the Proposed Program were identified by evaluating Proposed Program activities in the context of statewide and regional circulation patterns, impacts on existing roadway configurations, and relevance to standard traffic control plan requirements and strategies. The criteria for determining the significance of potential impacts are outlined below.

Because it is unknown where many cultivation sites would be located under the Proposed Program, it is not possible to determine specific impacts from cultivation activities at these sites. Even in cases where the sites are known, the statewide focus in this PEIR makes it infeasible to evaluate every site-specific impact. Potential impacts are instead discussed generally, at a programmatic level; in many cases, it would be speculative to conclude whether Proposed Program activities would result in significant adverse effects without knowing the location of the activities and specific roadways affected. Additionally, as noted throughout this PEIR, this analysis does not consider site development impacts (e.g., potential short-term traffic impacts related to the construction of cultivation facilities); rather, these types of effects are evaluated in Chapter 6, *Cumulative Considerations.*

As required in the Proposed Program regulations, licensees would be required to comply with site-specific regulations and requirements of the local jurisdiction, including land use and zoning designations, noise ordinances, and traffic requirements. This analysis assumes that local jurisdictions would be responsible for ensuring and enforcing compliance with local requirements.

Significance Criteria

For the purposes of this analysis, based on Appendix G of the State CEQA Guidelines, the Proposed Program would result in a significant impact related to transportation and traffic if it would:

A. Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation, including mass transit and non-motorized travel, and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit;

B. Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways;

C. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;

D. Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);

E. Result in inadequate emergency access; or

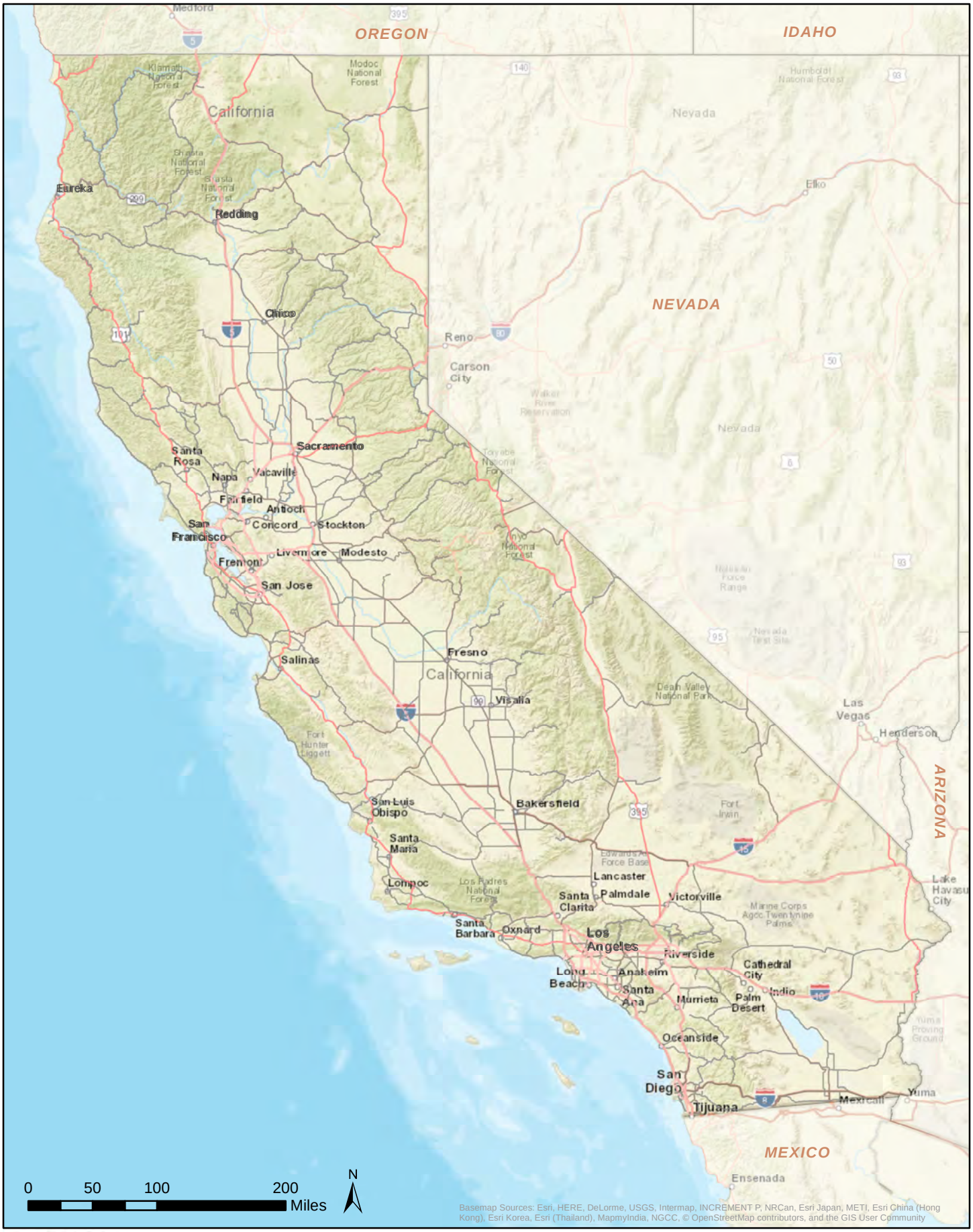
F. Conflict with adopted policies, plans, or programs regarding public transit, bicycle or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

Environmental Impacts of the Proposed Program

General Cultivation Impacts

Impact TRA-1: Conflict with circulation plans, ordinances, or policies. (Less than Significant)

General cultivation impacts include impacts of any type of cultivation activity: outdoor, mixed-light, indoor, nursery, and processing.



Horizon WATER and ENVIRONMENT

Interstate Highway
US Highway
State Highway

Source: California Department of Transportation (CalTrans)

Figure 4.12-1
Statewide Transportation Network

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Cannabis cultivation activities could generate vehicle trips from employees commuting to and from the site, movement or shipment of goods and equipment, and, for certain cultivation sites that also serve as retail locations, customers coming and going to the site to purchase products. While it is unknown how many workers would typically work at a given cultivation site, one 44,000-square-foot mixed-light facility visited during research conducted for the Draft PEIR reported that it employed 10 full-time workers and 15 part-time workers. The number of workers can increase on a periodic basis as harvests are completed and additional labor is needed to process the cannabis products. For outdoor cultivation, this would occur once per year in the fall; for indoor and mixed-light cultivation, it would occur more frequently, given that harvests can occur up to five times per year, and even more frequently if the cultivation site is divided into multiple groupings of plants at various stages of maturity.

Depending on the location of the cultivation site, the vehicle trips from the activities noted above could contribute to increased congestion or a decrease in circulation system performance. For those sites already in operation, ongoing effects would represent a continuation of baseline conditions and would not be a significant impact for purposes of CEQA. For sites that are currently unknown or which have not yet been established, it is speculative to determine whether and where such possible impacts may be significant; for example, it cannot be determined which specific circulation plans, ordinances, or policies may be applicable to a given cultivation project in this circumstance.

That said, in general, cannabis cultivation is not anticipated to generate substantial numbers of vehicle trips, as individual cultivation sites would be limited in size, and (as indicated by the reference operation discussed above) most sites would not contain a high density of employees or involve a large number of deliveries. Therefore, substantial conflicts with circulation plans, ordinances, or policies are not considered likely. While there could be impacts in particular locations, this is not anticipated to be a substantial issue considering the state as a whole. To the extent that local jurisdictions implement an approval process for cultivation, these agencies would consider and address these site-specific issues, such as ingress/egress, parking, and other requirements, in conformance with their own local traffic-related policies and with CEQA.

Overall, this impact would be **less than significant**.

Impact TRA-2: Conflict with congestion management programs. (Less than Significant)

As described in Impact TRA-1, cannabis cultivation could generate vehicle trips from employee commutes, shipment of materials, and other activities. Depending on the location of the cultivation site and conditions on nearby roadways, these additional vehicle trips could cause or worsen existing congestion or level of service (LOS) in particular locations, and, thereby, potentially conflict with an applicable congestion management program.

Compared to other types of development (e.g., retail establishments), however, cannabis cultivation does not typically generate large volumes of vehicle trips or traffic. In general, cannabis cultivation facilities would not employ a particularly high density of workers.

Given the programmatic nature of this PEIR and without knowing the location of any specific cultivation sites that may seek licensing under the Proposed Program, it is speculative to determine whether additional trips relating to cultivation activities could

adversely affect existing LOS or other standards and thereby conflict with a congestion management program. While impacts could result in particular locations, this is not anticipated to be a substantial issue considering the state as a whole. Therefore, this impact would be **less than significant**.

Impact TRA-3: Result in a change to air traffic patterns. (Less than Significant)

The operation of cultivation sites does not routinely include the use of aircraft. Cannabis cultivation operations do not typically involve buildings, structures, or land uses that are considered incompatible with airport activities (e.g., height that would obstruct landing/takeoff zones). It is possible that some cannabis cultivation sites may be located near airports. The location of such cannabis cultivation sites would need to adhere to zoning requirements and airport land use plans. It is not anticipated that cannabis cultivation would require or result in a change in location of any airports or air traffic such as to result in substantial safety risks, such as air traffic safety issues. Therefore, this impact would be **less than significant**.

Impact TRA-4: Increase hazards due to a design feature or incompatible uses. (Less than Significant)

Cannabis cultivation activities would not routinely require or result in road design changes. In specific instances, site development may require alterations to existing roads, addition of ingress/egress facilities, or addition of access roads, but such localized impacts would be analyzed by the local jurisdiction on a site-specific basis and are outside the scope of this analysis.

As an agricultural activity, cannabis cultivation could include some use of farm equipment, which could be operated on local roads for brief periods. Although operation of farm equipment on roadways could create a hazard from incompatible uses, in general cannabis cultivation is no more likely to substantially increase hazards on roadways than other types of agricultural activities, which would be taking place in many of the same areas of the state.

Overall, this impact would be **less than significant**.

Impact TRA-5: Result in effects on emergency access. (Less than Significant)

Cannabis cultivation operations may involve truck deliveries. Depending on the cultivation site, deliveries of materials and supplies could restrict emergency vehicle access to the site or to adjacent businesses for brief periods. However, any adverse effects related to emergency access would not be expected to be substantial because, in the event of an emergency, the truck(s) could be relocated.

In addition, local jurisdictions address emergency access through ingress/egress, commercial loading zones, and other requirements.

This impact would be **less than significant**.

Impact TRA-6: Result in effects related to public transit, bicycle, or pedestrian facilities. (Less than Significant)

Cannabis cultivation operations would not involve any alterations to existing public transit stops or bicycle/pedestrian facilities. While some workers at cultivation sites may use these modes of transportation to commute to and from the site, they would not be anticipated to substantially affect the capacity or operation of these facilities.

As described in Impact TRA-5, cannabis cultivation operations may involve deliveries and worker trips at cultivation sites. These activities could interfere with bicycle lanes or pedestrian facilities if they were to temporarily block passways. However, any such blockages would be short-term and therefore would not be considered a substantial adverse effect, particularly when considered on the statewide level of this PEIR.

In addition, local jurisdictions address proper ingress/egress and commercial loading zones, if necessary or appropriate, through their land use planning processes.

Therefore, this impact would be **less than significant**.

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4.13 Tribal Cultural Resources

4.13.1 Introduction

This section of the Program Environmental Impact Report (PEIR) presents the environmental setting and potential impacts of the California Department of Food and Agriculture's (CDFA's) CalCannabis Cultivation Licensing program (Proposed Program) related to tribal cultural resources (TCRs). TCRs include sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are included or determined to be eligible for inclusion in the California Register of Historic Resources (CRHR); included in a local register of historical resources; or determined by a lead agency, in its discretion and supported by substantial evidence, to be significant under CRHR criteria (Public Resources Code [PRC] Section 21074). As such, TCRs may contain physical cultural remains (i.e., materials found in archaeological sites), or they may be places within the natural landscape.

The key data source supporting this section is information from the California Native American Heritage Commission (NAHC).

4.13.2 Regulatory Setting

Federal Laws, Regulations, and Policies

Federal law does not address tribal cultural resources (TCRs), which are defined and regulated in the California Public Resources Code. However, similar resources, called Traditional Cultural Properties (TCPs), fall under the purview of Section 106 of the NHPA, as described in Section 4.5, *Cultural Resources.* TCPs are locations of cultural value that are historic properties. A place of cultural value is eligible as a TCP "because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community" (Parker and King 1990, rev. 1998). A TCP must be a tangible property, meaning that it must be a place with a referenced location, and it must have been continually a part of the community's cultural practices and beliefs for the past 50 years or more. Unlike TCRs, TCPs can be associated with communities other than Native American tribes, although the resources are usually associated with tribes. By definition, TCPs are historic properties; that is, they meet the eligibility criteria as a historic property for listing in the NRHP. Therefore, as historic properties, TCPs must be treated according to the implementing regulations found under Title 36 CFR §800, as amended in 2001.

State Laws, Regulations, and Policies

Assembly Bill 52 (Statutes of 2014, Chapter 532), which went into effect on July 1, 2015, requires that lead agencies under the California Environmental Quality Act (CEQA) consult with California Native American tribes that have requested in writing to be notified and that are traditionally and culturally affiliated with the geographic area of a proposed project, prior to the development of a CEQA document. Under the same bill, PRC Section 21084.2 specifies that a project with an effect that may cause a substantial adverse change in the significance of a TCR is a project that may have a significant effect on the environment. This latter language

was added to Appendix G of the State CEQA Guidelines, the initial study checklist, in 2016. The law requires that a project's CEQA lead agency consult with California Native American tribes as required under PRC Section 21080.3.1.

As defined in PRC Section 21074(a), TCRs are:

> (1) Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either of the following:
>
> a. Included or determined to be eligible for inclusion in the CRHR; or
>
> b. Included in a local register of historical resources as defined in subdivision (k) of Section 5020.1.
>
> (2) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Section 5024.1. In applying the criteria set forth in subdivision (c) of Section 5024.1 for the purposes of this paragraph, the lead agency shall consider the significance of the resource to a California Native American tribe.

In addition to Section 21074(a) above, TCRs are further defined under Section 21074(b) and (c) as follows:

> (b) A cultural landscape that meets the criteria of subdivision (a) is a TCR to the extent that the landscape is geographically defined in terms of the size and scope of the landscape; and
>
> (c) A historical resource described in Section 21084.1, a unique archaeological resource as defined in subdivision (g) of Section 21083.2, or a "nonunique archaeological resource" as defined in subdivision (h) of Section 21083.2 may also be a tribal cultural resource if it conforms to the criteria of subdivision (a) [of Section 21074].

Mitigation measures for TCRs may be developed in consultation with the affected California Native American tribe in accordance with PRC Section 21080.3.2 or Section 21084.3. The latter section identifies mitigation measures that include avoidance and preservation of TCRs and treating TCRs with culturally appropriate dignity, taking into account tribal cultural values and the meaning of the resource.

Local Laws, Regulations, Plans, and Policies

Local Ordinances

Some local ordinances governing cannabis cultivation, such as in Humboldt County, include requirements for tribal consultation. **Appendix E** provides a list of local ordinances related to commercial cannabis cultivation.

Local General Plans

Because the passage and implementation of PRC Section 21080.3.1 is so recent, TCRs are very rarely identified in city and county general plans, if at all. However, since the passage of Senate Bill 18 in 2004, which requires consultation with California Native American tribes

during the development of a general plan, many cities and counties have included requirements for consultation with the California Native American tribes traditionally and culturally affiliated with the area during development of their general plans or substantial general plan updates. Consultation with Native American tribes during the planning process would provide an opportunity for the identification of TCRs in cities and counties.

4.13.3 Environmental Setting

Tribal History in California

California had the densest aboriginal population within the continental United States prior to European and Euro-American colonization (Castillo 1978). Estimates of the number of indigenous inhabitants have varied widely over the decades, but the general consensus, at present, is that approximately 300,000 people representing 80 or more tribes lived within the borders of what we now call California (Castillo 1978, 2016; Cook 1978).

State Actions

California established the Native American Heritage Commission (NAHC) in 1976, whose responsibilities are codified in PRC Section 5097. The NAHC represents all of California's indigenous people, not just federally recognized tribes. One of the primary tasks of the office is to work with local agencies and developers to protect the cemeteries and sacred places that are integral to the cultures of Native Californians. As a member of the California Resources Agency, the NAHC also assists the departments within the agency with Native American issues.

Over the past 30 years, the State has moved to include California Indians in policy development and implementation on issues that directly affect their communities. The California State Legislature Joint Rules Committee issued Resolution No. 30 on March 2, 1994, in which the State reaffirmed recognition of California Indian tribes as sovereign governments. The resolution identified pursuit of "a policy of shared economic and cultural development" as a shared goal of the State and tribes.

With Assembly Joint Resolution No. 62, issued in August 2000, the California State Legislature requested that the federal government adequately fund law enforcement and judicial systems on tribal lands. Assembly Concurrent Resolution No. 185, filed in September of the same year, reaffirmed the State's acknowledgment of federally recognized tribes as sovereign nations; however, the Resolution went further by "encouraging" all State agencies to be respectful of and sensitive to tribal sovereignty when developing policy that would affect tribal rights or trust assets.

The California Native American Graves Protection and Repatriation Act of 2001 (Cal NAGPRA) provided California Indians with an avenue to control elements important to their cultures. Codified under Health and Safety Code Sections 8012-8021, Cal NAGPRA defines policy for the respectful treatment of human remains and funerary objects; provides for the identification and repatriation of those remains located in State facilities; and ensures that all California tribes, federally recognized or not, have the right to participate in repatriation and decisions about the disposition of such remains. Implementing regulations for Cal NAGPRA have not been developed.

Senate Bill 18, enacted in 2004, provided for active participation by tribal governments, as sovereign entities, in the planning processes for land use by local governments. Among other things, the law requires the establishment of "meaningful consultation" between local governments and affected tribes, and allows Native American tribes the opportunity to manage important cultural sites through easement acquisition. The bill includes all tribes, federally recognized or not, that are on the list of California tribes maintained by the NAHC.

Most recently, California tribes were given a voice in the environmental review of projects within the state and the protection of important cultural sites, by the enactment of AB 52 in 2015. A discussion of this law is included above under "State Laws, Regulations, and Policies."

Native American Consultation

The NAHC maintains a list of all California Native American tribes. CDFA contacted the NAHC on August 1, 2016, to request a comprehensive list of all tribes within the state. The NAHC responded on August 3, 2016, with a list that contained the contact information of 198 tribes and individuals. CDFA subsequently sent letters, via registered mail through the U.S. Postal Service, to all tribes included in the NAHC list on August 24, 2016. A follow-up letter was sent to all tribes on May 4, 2017. The letters described CDFA's intent to produce this PEIR for the Proposed Program and salient aspects of the Program itself. The letters provided notice of CDFA's consideration of the Program's potential to affect TCRs and invited the letter recipients to contact CDFA if they wished to consult on the Proposed Program in accordance with PRC Section 21080.3.1. Notification of the Proposed Program to California Native American tribes also demonstrates the CDFA's compliance with Executive Order B-10-11, which mandates that state agencies solicit input from tribes when developing regulations, rules, and policies that may affect their communities. Correspondence with the NAHC, a copy of CDFA's notification letter, and a complete list of all those contacted are provided in Appendix G**,** *California Tribal Contact Information*. CDFA received responses from 18 California Tribes, as listed in **Table 4.13-1**.

Table 4.13-1. Responses from Tribes

Tribe	Response Date	Tribe Designated Point of Contact	Notes
Fernandeno Tataviam Band of Mission Indians	08/26/2016 Via email	Kimia Fatehi, Public Relations Director	Requested consultation. CDFA met with Ms. Fatehi on January 9, 2017, to discuss the Tribe's concerns and interests relative to the Proposed Program
Barbareno/Ventureno Band of Mission Indians	08/27/2016 Via email from chairperson	Julie Tumamit-Stenslie, Chairperson	Wants to be notified during initial planning of proposed cannabis cultivation locations within the Tribe's cultural territory

Tribe	Response Date	Tribe Designated Point of Contact	Notes
Agua Caliente Band of Cahuilla Indians	08/29/2016 Letter via email from THPO	Patricia Garcia-Plotkin, Director	Requested consultation
	05/29/2017	Hannah Feeney	No meeting requested, just want to continue receiving updates
Kashia Band of Pomo Indians of the Stewarts Point Rancheria	08/29/2016 via email from THPO	Reno Franklin, Chairperson	Requested consultation on any potential effects of the Proposed Program on TCRs
Elk Valley Rancheria	08/29/2016	Dale Miller, Chairperson; Mr. Downes (attorney contact)	No in-person consultation requested, just wants to be kept in the loop; interested in obtaining a cultivation license
	05/23/2017	Dale Miller, Chairperson	No meeting requested
Northern Chumash Tribe	08/30/2016 Via email from chairperson	Mona Olivas Tucker	Any activity that would disturb soil, wetlands, springs, sensitive habitats, or any cultural landscape should be not allowed until there is a full assessment of impacts. Upon completion of the assessment, each project could be discussed and further considered.
Wiyot	09/01/2016 and 05/03/2016 Via email	Dr. Thomas Torma, Cultural Director	Requested consultation
	5/3/2017	Dr. Thomas Torma, Cultural Director	Requested consultation
Blue Lake	09/06/2016 Via email	Janet Eidsness, THPO	Requested consultation
Bear River	Included in emails from the Blue Lake and Wyot Tribes	Ericka Cooper	Requested consultation
Buena Vista Rancheria	09/06/2016	Roselynn Lwenya, THPO	Concerned about impacts on cultural and natural resources. Wants to receive information and work with CDFA to ensure protection of resources
Cabazon Band of Mission Indians	09/07/2016	Paul MacKey, Executive Director	Requested consultation

Tribe	Response Date	Tribe Designated Point of Contact	Notes
Santa Rosa Band of Cahuilla Indians	09/12/2016 Via email from Tribal general counsel	Thomas Weathers, Tribal general counsel	The Tribe is interested in obtaining a license under the Proposed Program. CDFA informed the Tribe that CDFA cannot license cultivation on tribal lands at this time
Resighini Rancheria	09/12/2016	Phil Smith, Program Assistant, Chairman's Office	Contacted P. Smith via e-mail and phone; no response
Alturas Indian Rancheria	09/12/2016	Darren Rose	No meeting requested; tribe wants to be kept in the loop with e-mail updates
Serrano Nation of Mission Indians	09/20/2016	Mark Cochrane, Tribal Council	Consultation not requested
Chemehuevi Reservation	09/24/2016	Charles F. Wood, Chairperson	Requested consultation
Ohlone/Costanoan-Esselen Nation	08/26/2016	Louise Miranda-Ramirez, Chairperson	Responded to notice of preparation; requested consultation
Rincon Band of Mission Indians	09/30/2016	Vance Whipple, Cultural Resources Manager	Contacted V. Whipple via phone and e-mail; no response
Karuk Tribe	05/02/2017	Leaf Hillman, Natural Resources Director	Responded to reissued notice of preparation; requested consultation
Benton Paiute Tribe	05/08/2017, via telephone	Tina Braithwaite	Wishes consultation
Yurok Tribe	05/11/2017, via email	Cheyenne Sanders, Deputy General Counsel	Wishes consultation; responded to reissued notice of preparation
Twenty-Nine Palms Band of Mission Indians	05/16/2017	Anthony Madrigal, Jr., THPO	Wishes consultation after Draft PEIR released
Dumna Wo-Wah Tribe	05/17/2017	Chris Acree; Chief Robert Ledger	Wishes consultation, but wants to review information first

Notes: THPO = tribal historic preservation officer

CDFA followed up, either by email or telephone, with all those who responded to the notification letters. CDFA is currently in the process of meeting with individual tribes to discuss their concerns about TCRs under the Proposed Program.

4.13.4 Impact Analysis

This section describes the methodology and significance criteria that were used to analyze TCRs. It then presents the analysis of the potential environmental impacts of the Proposed Program and presents mitigation measures to be implemented for potentially significant impacts.

Methodology

This analysis evaluates direct and indirect TCR-related impacts that may result from cultivation activities licensed under the Proposed Program. Potential cultural resource impacts have been compared against the thresholds of significance discussed below.

Significance Criteria

For the purposes of this analysis, based on Appendix G of the State CEQA Guidelines, the Proposed Program would result in a significant impact related to TCRs if it would:

A. Cause a substantial adverse change in the significance of a tribal cultural resource, defined in PRC Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American Tribe, and that is:

    a. Listed or eligible for listing in the CRHR or in a local register of historical resources as defined in PRC Section 5020.1(k); or

    b. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant under the criteria set forth in subdivision (c) of PRC Section 5024.1. In applying the criteria set forth in subdivision (c) of PRC Section 5024.1 for the purposes of this paragraph, the lead agency shall consider the significance of the resource to a California Native American tribe.

Environmental Impacts of the Proposed Program

General Cultivation Impacts

Impact TCR-1: Cause a substantial adverse impact on tribal cultural resources. (Less than Significant with Mitigation)

General cultivation impacts include impacts of any type of cultivation activity: outdoor, mixed-light, indoor, nursery, and processing.

Cannabis cultivation operations could require the construction of new or upgraded facilities (i.e., expanded grow or storage space, roads, water systems, electrical connections) that could result in direct impacts on existing TCRs within the premises of the cultivation operations, particularly those that are archaeological in nature. However, site development activities such as construction of new or upgraded facilities are outside the scope of the Proposed Program and would instead be approved by the local jurisdiction. Therefore, impacts from development activities are not considered here; they are discussed in Chapter 6, *Cumulative Considerations*, of this Draft PEIR.

With respect to cannabis cultivation, indirect impacts on some TCRs (e.g., sacred places), including resources that may have been previously unrecorded, in proximity to the premises could include disturbance from nighttime lighting or noise. As previously discussed, TCRs may be evidenced by the presence of human-made artifacts or alterations to the landscape, or they may be places in the natural environment, including the landscape itself; the presence of human remains may also indicate the presence of a TCR. The Proposed Program's environmental protection measures related to cultural resources, specifically the accidental discovery of human remains (Section 8313[c] of the proposed regulations), would require applicants to halt cultivation activities and implement Health and Safety Code Section 7050.5 if human remains were discovered.

In general, local governments would be responsible for conducting consultations with Native American tribes and evaluating impacts on (and, as applicable, developing mitigation for) TCRs through their local approval process, either for a site development process or for approval of a cannabis cultivation operation. However, because not all local governments will have an approval process for cannabis cultivation, CDFA will review individual license applications to determine whether tribes have already been consulted and impacts addressed by the local agency. If not, CDFA would implement **Mitigation Measure TCR-1 (Consult with Native American Tribes and Prepare and Implement Treatment Plans for any TCRs Identified at the Site)** to ensure compliance with State laws protecting TCRs. Through that process, any TCRs that could be affected by the cultivation operation would be identified through CDFA consultation with Native American tribes under PRC Sections 21080.3.1-21080.3.2, including any mitigation measures, as required in PRC Section 21082.3. Therefore, this impact would be **less than significant with mitigation**.

Mitigation Measure TCR-1: Consult with Native American Tribes and Prepare and Implement Treatment Plans for any TCRs Identified at the Site.

If tribes have not already been consulted for a particular cultivation license, CDFA shall conduct such consultation. This consultation will include coordination with local jurisdictions and/or the NAHC to identify tribes with a traditional and cultural affiliation to the site. CDFA will then send letters to relevant tribal representatives describing the proposed cultivation activity and inviting the tribe to engage in consultation and provide input on any potential TCRs that could be adversely affected.

If TCRs are identified through this process, CDFA shall consult and work with the tribes to develop feasible alternatives or mitigation measures that will avoid impacts or develop and implement treatment plans that will substantially lessen the impacts on identified TCRs, in accordance with PRC Sections 21083(b)(2) or 21084.3.

4.14 Utilities and Service Systems

4.14.1 Introduction

This section of the Program Environmental Impact Report (PEIR) presents the environmental setting and potential impacts of the California Department of Food and Agriculture's (CDFA's) CalCannabis Cultivation Licensing program (Proposed Program) related to utilities and service systems. Under the California Environmental Quality Act (CEQA), utilities and service systems include water, wastewater, stormwater, solid waste, and electricity and natural gas. Potential impacts on these systems typically relate to increased demand for services or other impacts that would require or result in the need for new or expanded facilities. In this PEIR, the energy use impacts of cannabis cultivation facilities are evaluated in Section 4.6, *Energy Use and Greenhouse Gas Emissions.* Additional information and impact analysis relating to water supply and demand are provided in Section 4.8, *Hydrology and Water Quality.* Additional information about disposal of hazardous materials is provided in Section 4.7, *Hazards, Hazardous Materials, and Human Safety.*

Information regarding utilities and service systems and the environmental impacts presented in this section is primarily based on the following sources:

- Peer-reviewed journal articles on cannabis cultivation impacts, including water use;
- Websites containing information on cultivation inputs and outputs and environmental impacts;
- First-hand accounts from individuals involved in cannabis cultivation encountered during site visits for the Proposed Program; and
- Regulatory orders regarding cannabis cultivation.

4.14.2 Regulatory Setting

Federal Laws, Regulations, and Programs

No federal laws, regulations, or programs were identified related to utilities and service systems and the Proposed Program.

State Laws, Regulations, and Programs

California Integrated Waste Management Act

The California Integrated Waste Management Act of 1989 (Public Resources Code [PRC], Division 30) requires all California cities and counties to implement programs to reduce, recycle, and compost at least 50 percent of wastes by 2000 (PRC Section 41780). The State, acting through the California Integrated Waste Management Board, determines compliance with this mandate. Per capita disposal rates are used to determine whether a jurisdiction's efforts are meeting the intent of the act.

State of California Water Rights Process

The State Water Resources Control Board (SWRCB) administers a water rights system for the diversion of surface waters. The granting of a water right permit provides permission to withdraw water from a river or stream for a "reasonable" and "beneficial" use. Before issuing the permit, SWRCB must take into account all prior rights and the availability of water in the basin, as well as the flows needed to preserve instream uses such as recreation and fish and wildlife habitat. Water right permits are administered using a seniority system based on the date of applying for the water right—commonly referred to as "first in time, first in right."

Water right holders, including riparian water right[1] holders, must report their diversions to SWRCB through a statement of diversion and use. Senate Bill 837, approved by Governor Jerry Brown on June 27, 2016, requires that persons filing a statement of diversion and use include information regarding the amount of water used, if any, for cannabis cultivation, and pay a fee associated with water used for cannabis cultivation. For further discussion of the administration of water rights for cannabis cultivation, refer to Section 4.8, *Hydrology and Water Quality.*

Urban Water Management Planning Act

California Water Code Section 10610 et seq. requires that all public water systems providing water for municipal purposes to more than 3,000 customers, or supplying more than 3,000 acre-feet per year, prepare an urban water management plan. Urban water management plans must identify and quantify available water supplies and current and projected water use and demands, and plan for maintaining adequate water supply reliability during normal, dry, and multiple dry water years.

California Health and Safety Code—Hazardous Waste and Hazardous Materials

Several sections of the California Health and Safety Code deal with hazardous waste and hazardous materials. Division 20, Chapter 6.5 addresses hazardous waste control and contains regulations on hazardous waste management plans, hazardous waste reduction, recycling and treatment, and hazardous waste transportation and hauling. These requirements are discussed in more detail in Section 4.7, *Hazards, Hazardous Materials, and Human Safety.*

Local Laws, Regulations, Plans, and Policies

At the time of writing of this Draft PEIR, local laws and regulations regarding cannabis cultivation are highly variable across jurisdictions in California. In some counties, cannabis cultivation is permitted on a commercial scale with varying degrees of regulation, whereas in other counties only limited indoor cultivation is permitted for personal use.

In areas where cultivation is permitted, many jurisdictions impose restrictions on cultivation activities to limit possible environmental impacts, such as those related to

[1] A riparian water right is a legal right to divert water associated with a property located directly adjacent to a water source. As opposed to appropriative water rights, riparian water rights do not require a permit or license from SWRCB and diversions are not restricted by amount or season of use.

wastewater discharge, water use, and solid waste disposal. For example, Amador County Ordinance No. 1755 requires that cultivators may not engage in unlawful or unpermitted drawing of surface water; Butte County's applicable ordinances (Nos. 4107, 4075, and 4051) require that cultivation sites be connected to municipalities' sewer system or have a county-inspected disposal system.

See **Appendix E** for a summary of existing and proposed local commercial cannabis cultivation ordinances in California. Note that local regulations governing cannabis cultivation are subject to change.

Only certain landfills in California are certified to accept commercial and industrial waste and hazardous materials in addition to domestic waste. Hazardous materials such as fuels and oils, chemicals, and pesticides must be disposed of in accordance with federal, state, and local regulations and ordinances; these are discussed in depth in Section 4.7, *Hazards, Hazardous Materials, and Human Safety.*

4.14.3 Environmental Setting

Water

Water service in California is provided by cities, counties, special districts, private companies, and State and federal agencies. Most incorporated areas, and many unincorporated communities, have centralized water treatment and distribution systems. In some parts of the state, the source for municipal water systems may be locally obtained surface water or groundwater, while in others it may be water from the State Water Project or other State facilities.

In portions of the state not served by centralized systems, residents may obtain water from private groundwater wells or by direct diversion from surface water bodies. Many individuals and entities in California have riparian or appropriative water rights allowing them to obtain surface water directly. As of 2016, a water right is not required to pump groundwater, although certain groundwater basins are adjudicated, restricting the volume of pumping, and others are undergoing sustainable groundwater planning in accordance with the Sustainable Groundwater Management Act (SGMA). More information on these topics is available in Section 4.8, *Hydrology and Water Quality.*

Wastewater

Wastewater service is provided in California by cities, counties, and special districts. State and federal agencies typically do not provide wastewater service, although the California Regional Water Quality Control Boards (RWQCBs) are responsible for enforcing waste discharge requirements. In incorporated areas of the state, as well as many unincorporated areas, houses and structures are typically connected to centralized wastewater collection and treatment systems. In areas of the state not served by centralized systems, residences typically use septic systems to dispose of wastewater.

Stormwater

Stormwater management and infrastructure vary throughout the state, with services typically provided by local jurisdictions. Urban and suburban areas typically have

stormwater collection infrastructure, where stormwater that runs off of impervious surfaces is directed to storm drain systems and either discharged directly to receiving surface water bodies or treated prior to discharge. Areas that have less impervious surface area may not have centralized stormwater infrastructure, and runoff may be discharged directly to natural land surfaces via overland flow or discharged to surface water bodies.

Electrical Service

A number of electrical service providers exist in California. In northern California, the largest service provider is Pacific Gas and Electric Company (PG&E), whereas in southern California, the largest providers are Southern California Edison (SCE) and San Diego Gas & Electric (SDG&E), among others.

Solid Waste

Solid waste landfills and processing facilities are located throughout the state. The condition of these facilities, and the remaining capacity available to accept new solid waste, is site specific. Under the Proposed Program, it is anticipated that many licensees would be located in areas served by municipal or county solid waste disposal programs, some of which offer curbside pickup of wastes. Some jurisdictions offer trash, recycling, and green-waste services, though these services are variable throughout the state. In certain parts of the state, licensees may be required to personally transport their wastes to appropriate disposal facilities.

Only certain landfills in California are certified to accept commercial and industrial waste and hazardous materials in addition to domestic waste. Most jurisdictions have household hazardous waste drop-off centers and recycling/recovery/transfer stations where small amounts of some types of hazardous materials (e.g., paint, used oil, automotive batteries) can be disposed of for collection and transport to certified facilities. Hazardous materials such as fuels and oils, chemicals, and pesticides must be disposed of in accordance with federal, state, and local regulations and ordinances; these are discussed in depth in Section 4.7, *Hazards, Hazardous Materials, and Human Safety.*

4.14.4 Impact Analysis

This discussion describes the methodology and significance criteria that are used to analyze utilities and service system impacts. It then presents the analysis of the potential environmental impacts of the Proposed Program.

Methodology

Potential impacts on utilities and service systems are evaluated qualitatively by considering aspects of the Proposed Program in light of the State CEQA Guidelines Appendix G significance criteria (listed below) and the existing regulatory and environmental setting. This evaluation considers the extent to which the Proposed Program would require entirely new or altered existing facilities to address immediate or foreseeable needs associated with Proposed Program operations, in accordance with the State CEQA Guidelines.

This analysis does not consider impacts from construction and development of new cannabis cultivation sites; rather, these effects are evaluated on a cumulative level in Chapter 6, *Cumulative Considerations*.

As noted above, effects related to energy use are evaluated in this PEIR in Section 4.6, *Energy Use and Greenhouse Gas Emissions.*

With respect to wastewater, this section focuses on discharges to wastewater treatment systems and does not address point-source or nonpoint-source discharge of wastewater or stormwater runoff to surface water or groundwater. That topic is addressed in Section 4.8, *Hydrology and Water Quality*.

The analysis of stormwater focuses on the volume of runoff that could be generated from cultivation sites compared to stormwater system capacity and the need for new or altered stormwater collection systems. Other issues related to stormwater, such as water quality impacts, are addressed in Section 4.8, *Hydrology and Water Quality*. Impacts related to water supply are also discussed in Section 4.8, *Hydrology and Water Quality*.

Significance Criteria

For the purposes of this analysis, based on Appendix G of the State CEQA Guidelines, the Proposed Program would result in a significant impact related to utilities and service systems if it would:

A. Exceed wastewater treatment requirements of the applicable RWQCB;

B. Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects;

C. Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects;

D. Result in a determination by the wastewater treatment provider which serves or may serve the project that it has inadequate capacity to serve the Proposed Program's projected demand in addition to the provider's existing commitments;

E. Be served by a landfill with insufficient permitted capacity to accommodate the Proposed Program's solid waste disposal needs; or

F. Fail to comply with federal, state, and local statutes and regulations related to solid waste.

Environmental Impacts of the Proposed Program

General Cultivation Impacts

Impact UTL-1: Exceed wastewater treatment requirements, result in expansion of wastewater treatment facilities, or result in a determination by the wastewater treatment provider that it has inadequate capacity to serve Proposed Program activities. (Less than Significant)

General cultivation impacts include impacts of any type of cultivation activity: outdoor, mixed-light, indoor, nursery, and processing.

As described in Chapter 3, *Proposed Program Activities,* Section 3.2.4, "Collection and Disposal of Waste Material," wastewater may be generated during cannabis cultivation operations from irrigation runoff, sanitary waste, or stormwater runoff. In urban areas, wastewater from cultivation would typically discharged to the local sewer or wastewater system. Wastewater treatment providers would consider potential impacts on their treatment systems when providing service to cultivators, and may establish pretreatment standards to avoid the need for new or altered facilities. In rural areas where a centralized sewer system is not available, wastewater may take the form of irrigation or stormwater runoff, and/or may be discharged into a septic system, depending on the size and location of the operation.

Wastewater associated with cultivation activities may contain contaminants such as sediment, chemicals, and trash. Wastewater discharged to a municipal sewer system could result in elevated levels of these contaminants in wastewater effluent. Wastewater treatment plants may not be capable of removing some chemicals used in cultivation, such as pesticides and pesticide residues (University of California, Integrated Pest Management [UC IPM] 2014). Particularly for indoor cultivation, hydroponic solutions may contain organic constituents that do not break down easily and may remain in effluent even after wastewater treatment.

As described in Section 4.7, *Hazards, Hazardous Materials, and Human Health,* the Proposed Program would require that pesticides are applied in accordance with manufacturer's instructions; if no label is available, the applicant must consult with the California Department of Pesticide Regulation (Section 8313[f][10]). This proper application of pesticides would reduce the amount of excess pesticide residue entering the sewer system from cultivation wastewater.

Because wastewater treatment systems across California vary in their treatment processes, age, remaining capacity, and other factors, it is difficult to determine whether and where impacts on these facilities may occur. In general, the amount of wastewater generated by cultivation operations would be relatively small to avoid the cost and risk of overwatering. However, some types of cultivation operations, such as hydroponics, may generate appreciable quantities of wastewater. Based on the site tours conducted as part of preparing this Draft PEIR, some cultivation operations would use reverse osmosis or other systems to recapture and reuse wastewater.

Overall, it would be unlikely that cultivation operations under the Proposed Program would generate such a substantial amount of wastewater, in the context of the overall wastewater

stream in a given location, that the construction of new or expanded wastewater treatment facilities would be required. However, in certain areas of the state where large numbers of cultivation operations may become established, and/or where existing wastewater treatment capacity is limited, the wastewater stream from licensed cultivators could conceivably exceed wastewater treatment requirements or exceed the capacity of existing treatment systems.

The specific locations where such a circumstance could occur are unknown. Therefore, because no site-specific information is available, including details on how the wastewater treatment provider would address the situation and the resources that could be affected, the potential for significant environmental effects from construction and expansion of such a wastewater system is unknown. In other words, the impact is considered speculative.

As noted above, wastewater treatment providers would consider potential impacts on their treatment systems when providing service to cultivators. In general, it is unlikely that wastewater from cultivation would create the need for new or altered facilities. For individual licenses, a site-specific evaluation would be necessary to evaluate whether significant impacts could occur at a particular location. To the extent that significant impacts are possible that have not been considered in this PEIR, a site-specific CEQA document would be required, for instance as part of the approval process undertaken by the local agency and/or other responsible agencies (including, potentially, CDFA).

Because of the small likelihood of impacts from cannabis cultivation, and the fact that any significant impacts would be addressed in site-specific CEQA documents by the agencies overseeing the wastewater treatment plant construction or expansion, the Proposed Program's impacts on wastewater treatment systems would be **less than significant**.

Impact UTL-2: Require or result in the construction of new or expanded water treatment facilities. (Less than Significant)

Cannabis has often been characterized as a high-water-use plant (Carah et al. 2015; Bauer et al. 2015; Reitz 2015). Bauer et al. (2015) and Carah et al. (2015) estimate that cannabis plants can consume up to approximately 6 gallons per plant per day, whereas grapes consume approximately 3.5 gallons per plant per day in the North Coast region of California.

Other authors, however, have reported that water use requirements for cannabis plants are similar to those of other agricultural crops, such as corn and alfalfa (Hammon et al. 2015). During site visits conducted during preparation of the Draft PEIR, several cultivators reported using less than 2 gallons per plant per day. One mixed-light cultivation operation reported using 800 gallons per day for the entire 44,000-square-foot facility.

Cannabis water requirements are described further in Chapter 3, *Proposed Program Activities.* While cultivators under the Proposed Program in certain areas of the state may obtain water from private groundwater wells, direct surface water diversion, rainwater catchment, or other sources, many cultivators may obtain water from municipal water systems. Depending on where these cultivation facilities are located and which public utilities would serve them, the water demand from cultivation could strain existing water treatment systems.

While it is unlikely that water demand from any one cultivation facility could require or result in construction of new or expanded water treatment facilities, particularly in light of size limitations for cultivation sites, if a number of operations were to be concentrated in an area with limited existing treatment capacity, construction of new facilities could be necessary. However, without knowing where specific cultivation facilities would be located, how and where any treatment system would be expanded (or a new system constructed), and what resources could be adversely affected by the expansion or new construction, conclusions regarding any significant impacts would be speculative.

In addition, as part of the application process, CDFA would consider site-specific information to evaluate whether significant impacts could occur at a particular location. To the extent that significant impacts are possible that have not been considered in this PEIR, a site-specific CEQA document would be required, for instance as part of the approval process undertaken by the local agency and/or other responsible agencies (including, potentially, CDFA). Should new or altered facilities be needed, the local jurisdiction and/or the water utility would likely be the lead agency evaluating the expansion or modification project under CEQA to address any significant environmental impacts that could arise.

Because of the small likelihood of impacts from cannabis cultivation and the fact that any significant impacts would be addressed in site-specific CEQA documents by the agencies overseeing the water treatment plant construction or expansion, this impact would be **less than significant**.

Impact UTL-3: Require or result in the construction of new or expanded stormwater facilities. (Less than Significant)

Facilities constructed and used for cannabis cultivation could generate stormwater runoff through an increase in impervious surfaces. Indoor, outdoor, and mixed-light facilities could include impervious areas such as warehouses, greenhouses, storage sheds, driveways, access roads, and related site improvements. Site development and its impacts, such as increased runoff from new impervious surfaces, falls outside the scope of the Proposed Program, which is a licensing program for the cultivation activities themselves. The impact of site development activities is considered in Chapter 6, *Cumulative Considerations*, of this Draft PEIR.

In addition, to the extent that stormwater collection facilities are already in place, there would be no change from the baseline condition in terms of volume or timing of runoff. As differentiated from site development, cannabis cultivation itself would not generate any increased stormwater runoff.

This impact would be **less than significant**.

Impact UTL-4: Potential to be served by a landfill with insufficient capacity. (Less than Significant)

As described in Chapter 3, *Proposed Program Activities,* cannabis cultivation operations may generate solid waste from various materials and containers used during cultivation (e.g., soils, fertilizers, pesticides, pots), as well as household trash from workers, discarded irrigation tubing, and other equipment.

Additionally, cannabis cultivation would typically generate green waste throughout the cultivation process from trimming of unwanted leaves and plant parts. The Proposed Program regulations require that the cultivator develop a cannabis waste disposal plan, which would require that the waste is disposed of at either a solid waste facility that has a permit to operate from the California Department of Resources Recycling and Recovery (CalRecycle), a composting materials handling facility that has a permit to operate from CalRecycle, or a designated composting area identified in the applicant's cultivation plan approved by CDFA.

Impacts on landfill capacity would depend on the specific landfill serving the cultivation site, and its remaining permitted capacity. While it seems unlikely that the volume of solid waste from any one cultivation facility could exceed landfill capacity, if a number of operations were to be concentrated in an area with limited remaining capacity, the capacity of the local landfill could be exceeded. However, without knowing where such a circumstance could arise, conclusions regarding any significant impacts would be speculative. In addition, it is unlikely that such circumstances would be widespread throughout the state as a result the Proposed Program; any specific instances would be appropriately addressed in a tiered CEQA document, which could consider the site-specific circumstances surrounding the impact.

Therefore, this impact would be **less than significant**.

Impact UTL-5: Failure to comply with existing statutes related to solid waste. (Less than Significant)

As noted in Impact UTL-4, the Proposed Program would require that prospective cultivators develop a cannabis waste disposal plan to identify appropriate management and disposal practices for cannabis waste.

Additionally, cultivators would be required to comply with all laws related to solid waste. This would include any ordinances or regulations promulgated by local jurisdictions pursuant to the California Integrated Waste Management Act, which requires that jurisdictions divert at least 50 percent of their wastes from landfill disposal, and sets jurisdiction-specific target disposal rates. An applicant for a license must comply with all local regulations and ordinances in the local jurisdiction in which the proposed cultivation operation is operating. This impact would be **less than significant**.

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Chapter 5
Alternatives Analysis

5.1 Introduction

This chapter describes the regulatory requirements related to evaluation of alternatives in this Program Environmental Impact Report (PEIR), presents the alternatives development process for the California Department of Food and Agriculture's (CDFA's) CalCannabis Cultivation Licensing program (Proposed Program), describes the alternatives considered and those considered but dismissed from detailed analysis, analyzes the environmental impacts of the alternatives considered, and identifies the environmentally superior alternative.

5.2 Regulatory Requirements

The California Environmental Quality Act (CEQA) requires that an EIR evaluate a reasonable range of alternatives to a proposed project, including a No Project (or, in the case of this PEIR, a No Program) Alternative. The No Project (or No Program) Alternative allows decision makers to compare the impacts of approving the proposed action against the impacts of not approving the action. Although no clear rule exists for determining a reasonable range of alternatives to a proposed project, CEQA provides guidance that can be used to define the range of alternatives for consideration in the environmental document.

With the exception of the No Project (Program) Alternative, the range of alternatives considered under CEQA must meet most of the basic project objectives, should reduce or eliminate one or more of the significant impacts of the proposed project (although the alternative could have greater impacts overall), and must be potentially feasible. In determining whether alternatives are potentially feasible, lead agencies are guided by the general definition of feasibility: "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors" (State CEQA Guidelines Section 15364). In accordance with Section 15126.6(f) of the State CEQA Guidelines, the lead agency should consider site suitability, economic viability, availability of infrastructure, general plan consistency, other regulatory limitations, and jurisdictional boundaries in determining the range of alternatives to be evaluated in an EIR. An EIR must briefly describe the rationale for selection and rejection of alternatives and the information that the lead agency relied on in making the selection. It also should identify any alternatives that were considered by the lead agency but were rejected as infeasible during the scoping process and briefly explain the reason for their exclusion (State CEQA Guidelines Section 15126[d][2]). These guidelines were used in developing the alternatives and their evaluation, as described next.

5.3 Alternatives Development Process

Alternatives to the Proposed Program were developed by first requesting and evaluating public feedback during the Draft PEIR scoping process. Alternatives suggested by the commenting public were evaluated for feasibility, ability to meet most of the basic program objectives, and ability to reduce the severity of one or more significant impacts of the Proposed Program. Additional alternatives were developed by assessing the potential impacts of the Proposed Program and making modifications to particular attributes of the Proposed Program to reduce one or more of these impacts. Alternatives that were determined to be infeasible, failed to meet most of the basic program objectives, or failed to reduce at least one of the potential impacts of the Proposed Program were removed from further evaluation. The remaining alternatives were evaluated in detail.

Note that, in most cases, the Proposed Program avoids significant impacts through inclusion of environmental protection measures in the proposed regulations that would address and prevent such effects, and the potentially significant effects of the Proposed Program are few. Therefore, several alternatives were considered that would reduce or eliminate the need for one or more environmental protection measures to ensure that an effect would not be significant, but that would not, strictly speaking, reduce or avoid an identified significant effect of the Proposed Program.

Finally, the Medical Cannabis Regulation and Safety Act (MCRSA) and Adult Use of Marijuana Act (AUMA) prescribe various aspects of CDFA's licensing program, such as the types of licenses to be issued. These legal requirements have the effect of limiting the range of potentially feasible alternatives that could be considered. In the interest of considering as wide a range of alternatives as possible, this analysis considers alternatives that may not fully conform to these laws, or that would require legislative action or a voter ballot initiative to enact, even if the likelihood of the legislature or voters enacting such changes may be low or is unknown (and therefore such alternatives may not be feasible).

The objectives and significant impacts of the Proposed Program are presented next, because these factors were fundamental to the evaluation of alternatives.

5.3.1 Program Objectives

The Proposed Program has the following objectives:

- Establish minimum requirements for indoor, outdoor, and mixed-light commercial cannabis cultivation operations that must be achieved by cultivators in order to obtain a cultivation license from CDFA;
- Establish a license limit on the quantity of licenses issued for the medium size cultivation categories;
- Require that individual and cumulative effects of water diversion and discharge associated with cultivation do not affect the instream flows needed for fish spawning, migration, and rearing, and the flows needed to maintain natural flow variability;

- Require that cultivation will not negatively impact springs, riparian wetlands, and aquatic habitats;
- Require that cannabis cultivation by licensees is conducted in accordance with applicable federal, State, and local laws related to land conversion, grading, electricity usage, water usage, water quality, woodland and riparian habitat protection, species protection, agricultural discharges, and similar matters;
- Establish procedures for the issuance and revocation of unique identifiers for activities associated with a cannabis cultivation license;
- Prescribe standards for the reporting of information as necessary related to unique identifiers; and
- Establish a scale of application, licensing, and renewal fees based upon the cost of administering and enforcing the Program; and
- Develop a cultivation checklist tool that can be used by CDFA, other agencies, and local governments to evaluate environmental impacts of cannabis cultivation license programs

5.3.2 Significant Environmental Impacts of the Proposed Program

As described above, the Proposed Program includes environmental protection measures to avoid impacts that may otherwise be significant. In addition, several mitigation measures have been identified to reduce significant impacts to a less-than-significant level:

- Potentially significant impacts on cultural resources related to disturbance of unknown resources would be reduced to a less-than-significant level after the implementation of mitigation measures to ensure that licensees would comply with State regulations regarding protection of cultural resources.

- Impacts related to tribal cultural resources were found to be potentially significant, but would be mitigated to a less-than-significant level through CDFA's consultation with Native American tribes if a local jurisdiction has not already consulted for a particular cultivation license.

5.4 Alternatives Considered

The following alternatives were considered because they are required by statute or would meet most of the Proposed Program objectives, are potentially feasible, and would avoid or substantially reduce one or more potentially significant impact of the Proposed Program:

- No Program Alternative
- No Natural Light Alternative
- No High-Intensity Grow Light Alternative
- Restricted Size Alternative

These alternatives are defined below.

5.4.1 No Program Alternative

Under the No Program Alternative, CDFA would not implement the CalCannabis Cultivation Licensing program; create, issue, renew, discipline, suspend, or revoke licenses for the cultivation of cannabis; or collect fees in connection with activities regulated by the Proposed Program. CDFA would not implement the proposed track-and-trace system for the purposes of tracking medical cannabis, nor would the agency implement the proposed reporting system, fees, and documentation requirement imposed by such a program. For the purposes of discussion, it is assumed that existing cannabis cultivation operations (both permitted and unpermitted) would continue to operate under the existing regulatory climate. The No Program Alternative would fail to meet MCRSA and AUMA obligations, which require CDFA to adopt regulations to establish a cannabis cultivation licensing program and track-and-trace system. In particular, MCRSA establishes Business and Professions Code Section 19302.1(e), which states that CDFA "shall administer the provisions of this chapter related to and associated with the cultivation of medical cannabis...." Similarly, Section 2, Paragraph I of AUMA states, "[T]he Department of Food and Agriculture will license and oversee marijuana cultivation…."

Because no information exists to determine whether commercial cannabis cultivation would increase or decrease under the No Program Alternative, it is assumed to remain static in terms of the types of grow operations (outdoor, indoor, mixed light), nurseries and processors, and the extent of unpermitted operations.

5.4.2 No Natural Light Alternative

The No Natural Light Alternative would require that all cultivation be limited to the use of artificial light, and only indoor cultivation would be allowed. This would eliminate license types for outdoor and mixed-light cultivation, as both techniques rely upon natural light. As described in Chapter 3, *Proposed Program Activities*, indoor cultivation is conducted within buildings without the use of any natural light. High-intensity lighting is typically used to stimulate photosynthetic activity and plant growth, and the duration of light and darkness is manipulated to simulate and accelerate the seasonal changes in daylight that trigger various growth stages of the plant. In some cases, the intensity of light is also changed throughout a particular photoperiod to simulate the changing intensity of sunlight throughout the day. The No Natural Light Alternative would include a track-and-trace component similar to that described for the Proposed Program. The No Natural Light Alternative would be inconsistent with MCRSA and AUMA because it would foreclose the outdoor and mixed-light cultivation license types. Accordingly, the California State Legislature would need to amend MCRSA and AUMA to allow implementation of this alternative.

5.4.3 No High-Intensity Grow Light Alternative

The No High-Intensity Grow Light Alternative would require that all cannabis cultivation operations use natural light and/or low-intensity artificial light (below a rate at which indoor cultivation would be viable). This would foreclose the ability to conduct indoor cultivation. In addition, outdoor licenses would not be allowed to use high-intensity grow lights for propagation. The No High-Intensity Grow Light Alternative would include a track-and-trace component similar to that described for the Proposed Program. The No High-Intensity Grow

Light Alternative would be inconsistent with MCRSA and AUMA because it would foreclose the indoor cultivation license types. Accordingly, the California State Legislature would need to amend MCRSA and AUMA to allow implementation of this alternative.

5.4.4 Restricted Size Alternative

The Restricted Size Alternative would limit the size of cultivation sites to "Specialty" or "Small Cultivator" sized operations, less than 10,000 square feet. This alternative was suggested during the Draft PEIR scoping process. This would eliminate the issuance of medium cultivation licenses; for adult (nonmedical) use, would eliminate the issuance of licenses for large outdoor cultivation; and would add a size restriction to nursery licenses. The Restricted Size Alternative would include a track-and-trace component similar to that described for the Proposed Program. The Restricted Size Alternative would be inconsistent with MCRSA and AUMA because it would foreclose the medium and large cultivation license types. Accordingly, the California State Legislature would need to amend MCRSA and AUMA to allow implementation of this alternative.

5.5 Alternatives Considered and Dismissed

The following alternatives were considered in the planning process but were dismissed from further evaluation for one or more of the following reasons: (1) they were not substantively different from one of the considered alternatives; (2) they would not sufficiently meet most of the Program objectives; (3) they were determined to be infeasible; or (4) they would not avoid or substantially reduce one or more potentially significant impacts under the Proposed Program:

- Agricultural Zoning Restrictions
- No Pesticide Alternative
- No Exterior Lighting Alternative
- Limits on Number of Permits
- Alternatives that would duplicate other regulatory programs

These alternatives and the reasons for their rejection are further described below.

5.5.1 Agricultural Zoning Restrictions

The Agricultural Zoning Restrictions Alternative was suggested during the Draft PEIR scoping process. Under this alternative, cannabis cultivation would be allowed only on land zoned for agricultural uses. This alternative was conceptualized to reduce potential for impacts or avoid other undesirable outcomes on lands not zoned for agriculture, such as conversion of forestland to nonforest uses or public safety concerns related to cultivation in urban and residential areas.

As described in Section 4.9, *Land Use and Planning*, zoning designation and the way lands are designated to be used, including land use objectives and restrictions, are decisions regulated by cities and counties at a local level under the general police powers delegated to them by the State. General plans are highly variable among cities and counties because they serve to

address local issues surrounding planned growth, development policies, local objectives, and principles for a given area. The needs of cities and counties are highly variable, as are the zoning designation titles, restrictions on land usage within a particular zoning designation, and rules and regulations enforced for local planning purposes. As a result, the decisions of where and how land is designated and used, including land designated for agricultural usage, is a decision made by local municipalities. CDFA does not have general regulatory authority over local use and has not been authorized by the legislature to supersede the authority of local jurisdictions by limiting cannabis cultivation to agricultural land use designations.

In addition, many local jurisdictions have adopted or are considering adopting ordinances pertaining to cannabis cultivation siting and zoning restrictions. In many cases, local municipalities specify zoning requirements for cannabis cultivation and limit the number of plants in certain zoning districts. Table E-1 in Appendix E, *Summary of Existing and Proposed Local Commercial Cannabis Cultivation Regulations,* summarizes regulations that have been adopted by local jurisdictions for every county in the state (as of December 31, 2016). Table E-2 summarizes city ordinances adopted by the 10 largest cities in California by population. Given the variability among cities and counties pertaining to zoning designations and restrictions, along with CDFA's inability to regulate and enforce zoning decisions, this alternative was considered infeasible and is not evaluated in this Draft PEIR.

5.5.2 No Pesticide Alternative

The No Pesticide Alternative, which would prohibit use of any pesticide by licensees, was considered but dismissed for several reasons. First, the range of pesticides not prohibited from use on cannabis is narrow to begin with and excludes many of the pesticides of most concern for adverse effects on humans, wildlife, and water quality. Second, the Proposed Program contains measures which would effectively avoid the potential for significant adverse impacts. As such, eliminating all pesticides would not substantially reduce the potential impacts of the Proposed Program.

5.5.3 No Exterior Lighting Alternative

The No Exterior Lighting Alternative, which would prohibit all exterior lights at cultivation sites, would address any potential light trespass issues associated with exterior lighting. The alternative was considered but dismissed because exterior lighting is necessary for adequate security and safety; therefore, CDFA does not believe the alternative to be viable. In addition, the Proposed Program regulations contain environmental protection measures to ensure that impacts of lighting would not be significant.

5.5.4 Limits on Number of Permits

MCRSA and AUMA require that CDFA place a limit on the number of medium size cultivation licenses that could be issued to a single owner. Accordingly, the proposed medical cannabis cultivation regulations limit medium size licenses to one per person. While neither MCRSA nor AUMA contains other directives to limit the number of other permit types that could be issued, such an alternative could conceivably limit the environmental impacts of the Proposed Program. However, this alternative was not considered feasible because it does not appear to be within the legislative intent of MCRSA or AUMA. One primary purpose of MCRSA

and AUMA is to bring unpermitted activities within the licensing program. Limiting the number of permits that may be issued could create an additional barrier to entry and affect the number of unpermitted cultivators who participate in the licensing program. In addition, because the numbers and locations of the various types of permits that may be requested by applicants under the Proposed Program are unknown, the location and intensity of related environmental impacts is difficult to ascertain. As such, no basis was available to determine an appropriate limit on state as a whole.

5.5.5 Alternatives That Would Duplicate Other Regulatory Programs

Several alternatives were suggested in public scoping to address issues such as water quality, water rights, and effects on streams and riparian areas. For many of these suggested alternatives, agencies such as the State Water Resources Control Board and California Department of Fish and Wildlife have existing regulatory programs that address the issue and/or are developing programs specific to cannabis cultivation. Based on CDFA's review and understanding of these regulatory programs, they already contain (or are anticipated to contain, upon completion) adequate requirements to ensure that impacts would not be significant. For instance, the existing Lake and Streambed Alteration Program administered by CDFW should ensure that significant adverse effects do not occur in streams, lakes, and riparian areas. As such, no additional CDFA regulations have been identified as necessary to further reduce impacts on such resources, and CDFA defers to the agencies with jurisdiction over these topics. As such, this alternative would create a duplicative regulatory structure and would not substantially reduce any impacts of the Proposed Program.

5.6 Alternatives Impact Analysis

5.6.1 No Program Alternative

Aesthetics

Under the No Program Alternative, medical and unpermitted cannabis cultivation would continue to operate under the existing regulatory climate. In particular, unpermitted cultivation sites have been identified as sources of human waste, household refuse, abandoned equipment, and other trash, which would have adverse aesthetic effects. (Horizon 2017). Because such cultivation is unregulated and would remain so under the No Program Alternative, the adverse aesthetic effects would continue as a local enforcement issue. In contrast, under the Proposed Program, a portion of unpermitted cultivators currently operating would obtain licenses, operate lawfully, and be subject to local jurisdiction requirements, including those intended to minimize or avoid adverse aesthetic impacts. As such, compared to the aesthetic impacts of the Proposed Program, the No Program Alternative would have adverse impacts that would continue and would have greater impacts than the Proposed Program.

Agriculture and Forestry Resources

The No Program Alternative would make no changes to existing cannabis cultivation operations. Similar to the Proposed Program, this alternative would not result in the

conversion of farmland to non-agricultural use or conflict with existing zoning for agricultural use or Williamson Act contracts.

This alternative could lead to continued conversion of timberland, in particular related to unpermitted cultivation operations, which would not follow existing laws, protocols, and policies currently required by the California Department of Forestry and Fire Protection (CAL FIRE) or local jurisdictions. Some portion of these unpermitted cultivators would become part of the regulated community under the Proposed Program. Thus, the No Program Alternative would have adverse impacts that would continue, compared to the Proposed Program.

Air Quality

Because the No Program Alternative would not include Proposed Program requirements related to use of generators and energy efficiency, it would result in continued air emissions that could conflict with applicable air quality plans, policies, or regulations and exceed ambient air quality mass emission thresholds. As such, air emissions would be greater under the No Program Alternative.

Odors generated by cultivation activities under the No Program Alternative would be similar to those of the Proposed Program. Unregulated cultivators may have less oversight by local government agencies that work to control nuisance odors. Under the Proposed Program, local jurisdictions may have more ability to confirm compliance with local ordinances designed to control odors associated with sites that become regulated under the Proposed Program.

Biological Resources

To the extent that cannabis cultivation remains unregulated under this alternative, potential exists that unpermitted cultivators would not follow existing permits, protocols, and policies that would provide protection to biological resources. In particular, illegal pesticide use and contamination of water bodies is of great concern. Under the No Program Alternative, such impacts would continue, compared to the Proposed Program, under which impacts would be mitigated by an increase in the proportion of licensed growers who would comply with applicable laws and regulations protecting biological resources. For these reasons, the No Program Alternative would have greater impacts on biological resources than the Proposed Program.

Cultural Resources

This alternative would protect cultural resources to the extent that compliance with existing laws, protocols, and policies would provide protection. Compared to the Proposed Program, this alternative would not provide a licensing program to ensure that cultivators planning to or conducting ground-disturbing operations conduct studies to identify significant cultural and paleontological resources in or adjacent to licensed premises, and develop and implement sufficient mitigation measures. Therefore, the No Program Alternative would have greater impacts on cultural resources than the Proposed Program.

Energy Use and Greenhouse Gas Emissions

Because the No Program Alternative would not include Proposed Program requirements related to use of generators and energy efficiency measures, it would result in greater levels of energy use and greenhouse gas (GHG) emissions, compared to the Proposed Program. In other words, these Proposed Program requirements are anticipated to reduce energy use and GHG emission compared to baseline conditions (and, therefore, compared to the No Program Alternative), despite the anticipated increase in indoor production under the Proposed Program. Therefore, the No Program Alternative would have greater impacts than the Proposed Program on energy use and GHG emissions.

Hazards, Hazardous Materials, and Human Health

Under the No Program Alternative, unregulated use of hazardous materials and the presence of hazardous conditions (e.g., substandard electrical systems) would continue among many illegal cultivators. In comparison, the Proposed Program would ensure a higher proportion of lawful, licensed cultivators, helping to ensure that existing permits, protocols, and policies are followed to protect public safety, such as adherence to building, electrical, and fire codes. In addition, cultivators under the No Program Alternative would be exposed to a wider range of potentially harmful pesticides and chemicals during cultivation activities, because the use of such chemicals would be unregulated. The Proposed Program requires lawful use of pesticides and chemicals that may be used during cannabis cultivation, and also includes worker safeguards for the application and use of these pesticides, thereby protecting the health of cultivation employees. Therefore, the No Program Alternative would have greater impacts than the Proposed Program related to hazards, hazardous materials, and human health.

Hydrology and Water Quality

Compared to the Proposed Program, the No Program Alternative would not provide a licensing program under which local jurisdictions would confirm that cultivators have been permitted and/or have obtained appropriate water rights, permits, are in compliance with waste discharge requirements and are implementing appropriate best management practices. Therefore, the No Program Alternative would have greater impacts on hydrology and water quality than the Proposed Program.

Land Use and Planning

Under the No Program Alternative, cannabis cultivation would continue to operate under the existing regulatory climate, which includes existing land use plans, policies, regulations, and cannabis-specific ordinances. However, compared to the Proposed Program, this alternative would not provide a licensing program under which local jurisdictions would confirm that cultivators have sited operations in locations consistent with local land use regulations and policies and that local discretionary permits have been obtained. In addition, a greater number of unpermitted cultivators would continue under the No Program Alternative, compared to the Proposed Program, and such unpermitted cultivators would sometimes be operating in conflict with existing land use plans, policies, and regulations. Therefore, the No Program Alternative would have greater impacts related to land use and planning, compared to the Proposed Program.

Noise

A larger proportion of cultivators would be unregulated under the No Program Alternative, compared to the Proposed Program. Unregulated cultivators would be less likely to follow local protocols and policies that provide protection against excessive noise, such as local noise ordinances. That said, unregulated cultivators may also seek to avoid noise-generating activities to avoid detection. Regardless, because of the lack of local oversight over unlawful cultivators on topics such as noise, the No Program Alternative would have greater potential for adverse noise impacts, compared to the Proposed Program.

Public Services

Under the No Program Alternative, existing cannabis cultivation would continue to operate under the existing regulatory climate and a greater proportion of unpermitted cultivation would occur compared to the Proposed Program. Criminal activities surrounding cannabis cultivation that require police protective services would continue at a similar rate and demand as under baseline conditions. Fire protection needs would also continue related to substandard electrical systems. These adverse impacts would be reduced under the Proposed Program through safety measures implemented by CDFA and local jurisdictions such as security requirements, engagement of law enforcement, and adherence to fire codes. As such, this alternative would have greater public service impacts compared to the Proposed Program.

Transportation and Traffic

To the extent that cannabis cultivation is unregulated under the existing condition, this situation would continue under the No Program Alternative, limiting the ability of local jurisdictions to implement requirements to address any impacts related to transportation and traffic. Therefore, the No Program Alternative would have greater impacts on transportation and traffic compared to the Proposed Program.

Tribal Cultural Resources

Continued unpermitted cannabis cultivation under the No Program Alternative would create the potential for new or ongoing impacts on tribal cultural resources. As compared to the Proposed Program, this alternative would not provide a licensing program to ensure that local jurisdictions consult with Native American tribes under Public Resources Code (PRC) Sections 21080.3.1 and 21080.3.2 and, where applicable, implement sufficient mitigation measures as required in PRC Section 21082.3. Therefore, the No Program Alternative would have greater impacts on tribal cultural resources compared to the Proposed Program.

Utilities and Service Systems

To the extent that unpermitted cultivation would be greater under this alternative compared to the Proposed Program, documented adverse impacts related to water diversions, stormwater and wastewater generation, and solid waste disposal would continue. Therefore, the No Program Alternative would have greater impacts related to utilities and service systems compared to the Proposed Program.

5.6.2 No Natural Light Alternative

Aesthetics

Under the No Natural Light Alternative, the cultivation of cannabis would be limited to the use of indoor cultivation techniques. These activities typically take place within windowless buildings or rooms where high-intensity lighting can be managed without the presence of additional natural lighting from windows. As such, they would not be visible to the public.

Mixed-light and outdoor cultivation operations under the Proposed Program would generally not have substantial adverse aesthetic effects. However, this alternative would eliminate any potential for adverse aesthetic effects related to these cultivation approaches. This, in combination with the fact that indoor cultivation has limited potential for adverse aesthetic impacts, leads to the conclusion that this alternative would have reduced potential for adverse aesthetic impacts compared to the Proposed Program.

Agriculture and Forestry Resources

Similar to the Proposed Program, the No Natural Light Alternative would not result in the conversion of farmland to nonagricultural use or conflict with existing zoning for agricultural use or Williamson Act contracts. In addition, by disallowing outdoor and mixed-light cultivation, which often occurs in rural areas, it would reduce the potential for cultivation sites to be located in areas of forest land. In contrast, indoor cultivation would primary occur in previously developed locations such as urban areas. Therefore, the potential for this alternative to result in conversion of forest land to nonforest use would be less than that of the Proposed Program.

Air Quality

While indoor cultivation does not involve the types of gas-powered equipment used in outdoor cultivation, it is an energy-intensive form of cultivation that requires use of high-intensity grow lights; heating, ventilation, and air conditioning systems; humidification systems; and water systems, resulting in emissions of criteria pollutants. To the extent that indoor cultivation would increase under this alternative, with a corresponding decrease in outdoor and mixed-light cultivation, such emissions would increase, resulting in greater potential for adverse impacts related to criteria pollutant emissions.

While odors may be more contained using indoor cultivation techniques, indoor cultivation sites are often located in more densely populated areas with greater numbers of people who may be exposed to such odors. Without information regarding the relative balance between these two factors, it would be speculative to make a conclusion related to odor.

Biological Resources

Indoor cultivation activities typically occur within developed urban and industrial environments that tend to be previously disturbed and have diminished biological value. As a result, this alternative, compared to the Proposed Program, would have less potential for impacts on biological resources, including impacts on riparian habitats, federally protected wetlands, and other sensitive and special-status species and habitats. Similar to the Proposed

Program, licensees under this alternative would be required to comply with all local policies and ordinances, including those protecting biological resources.

Cultural Resources

Indoor cultivation activities typically occur within developed urban and industrial environments that tend to be previously disturbed and have diminished potential for the presence of cultural resources. As a result, this alternative, compared to the Proposed Program, would have less potential for impacts on cultural resources. Similar to the Proposed Program, this alternative would require that local jurisdictions issuing licenses comply with CEQA. Should ground-disturbing activities and/or site development for the establishment of cannabis cultivation take place, licensees would be required as part of this alternative to conduct studies to identify significant cultural and paleontological resources in or adjacent to the licensed premises and develop mitigation measures according to State CEQA Guidelines 15126.4(b), if any such resources were identified.

Energy Use and Greenhouse Gas Emissions

Limiting cultivation to indoor techniques would result in a large increase in energy use and GHG emissions. While Proposed Program measures to ensure energy efficiency would still be required, indoor cultivation would still exceed the energy footprint of the outdoor and mixed-light cultivation approaches it would replace. Because these alternate approaches are less energy intensive, this alternative would result in the wasteful and inefficient use of energy, and the increase in GHG emissions would be considered substantial. To address these issues, measures could be considered that would require the increased use of renewable energy resources for cannabis cultivation. While this would not prevent the wasteful or inefficient use of energy, it could effectively address the increase in GHG emissions that would result from this alternative.

Hazards, Hazardous Materials, and Human Health

Under this alternative, impacts from routine transport, use, and disposal of hazardous materials; accidental upset or release of hazardous materials; and/or potential impacts on nearby sensitive resources (such as schools and airports) would be similar to those of the Proposed Program.

However, as discussed in Section 4.7, indoor cultivation has been linked to several potential health hazards, including increased fire risk, increased mold levels, and elevated carbon dioxide (CO_2) levels. These issues are generally less pronounced at outdoor and mixed-light cultivation sites. That said, licensed indoor cultivation sites would be required to follow applicable requirements, such as electrical codes and limits on mold established by the California Department of Industrial Relations, Division of Occupational Safety and Health, and CO_2 levels, which would ensure that impacts would not be significant. Regardless, by limiting cultivation to indoor environments, impacts related to these topics would be greater than under the Proposed Program.

Hydrology and Water Quality

Indoor cultivation sites often involve the use of municipal utilities and infrastructure for water supplies, wastewater discharges, and stormwater runoff. In addition, by being indoors, the sites are less likely to be subject to erosion or releases of contaminants into stormwater. That said, outdoor and mixed-light cultivators must comply with various regulatory requirements that minimize the potential for hydrology and water quality impacts, ensuring that such impacts under the Proposed Program would not be significant. Regardless, limiting cultivation to indoor environments would further reduce the potential for adverse impacts.

Land Use and Planning

Impacts related to land use and planning as a result of the No Natural Light Alternative would be similar to those of the Proposed Program. Under this alternative, as with the Proposed Program, licensed cultivators would be required to conduct their activities in accordance with State and local laws and regulations, including local land use plans, local coastal programs, and zoning ordinances. Issuance of licenses by CDFA would be contingent upon local approval and, therefore, would not conflict with existing zoning and land use compatibility requirements set forth by individual local jurisdictions.

Noise

The No Natural Light Alternative would eliminate the potential for heavy equipment noise associated with outdoor and mixed-light cultivation. However, a greater noise impact would be generated by equipment used for indoor cultivation. The extent to which these two factors offset one another would be dependent on site-specific details related to these cultivation operations. In addition, indoor cultivators are more likely to be located in developed areas, closer to neighbors who may be more sensitive to noise impacts. Indoor cultivators, however, would be required to comply with local noise standards and, overall impacts would not be substantially different from those of the Proposed Program.

Public Services

Under the No Natural Light Alternative, impacts on police protection services, schools, parks, and other public facilities would be similar to those of the Proposed Program. As with the Proposed Program, drawing a conclusion regarding an increase in demand for law enforcement such that new or expanded facilities are needed in any particular location is speculative. This alternative would meet statutory requirements to prohibit cultivation sites within 600 feet of schools, reducing the potential for conflicts with school operations. Similar to the Proposed Program, it would be speculative to predict population growth in any particular location to such an extent that it would result in increased demand for schools, parks, or other facilities.... Such needs would be addressed by local jurisdictions on a case-by-case basis and would be subject to CEQA and other environmental regulations.

As discussed in Section 4.7, *Hazards, Hazardous Materials, and Human Health*, and Section 4.11, *Public Services*, indoor cannabis cultivation has potential for an elevated risk of fire and can pose risks to firefighters and other first responders. The proposed regulations would require compliance with fire codes and notification of local fire departments regarding fire risk, which would ensure that these impacts would not be significant. While the actual risk

associated with these issues may increase under this alternative, they would not be sufficient to require new or expanded fire protection facilities. As such, impacts would not differ substantially from those of the Proposed Program.

Transportation and Traffic

Under this alternative, impacts on transportation and traffic would be similar to those of the Proposed Program. Cultivation of cannabis would not generate substantial vehicle trips; conflict with circulation plans, ordinances, or policies; substantially conflict with congestion management programs; result in substantial change to air traffic patterns; have a significant impact on emergency access; or have a significant impact on bicycle and pedestrian access and public transit. While the location of traffic associated with cultivation may shift depending upon the locations of indoor cultivation compared to those of outdoor and mixed-light sites, cultivators would be required to comply with policies of local jurisdictions and to consider and address site-specific issues such as ingress/egress, parking, and other requirements.

Tribal Cultural Resources

Similar to the Proposed Program, this alternative would require that CDFA consult with Native American tribes under PRC Sections 21080.3.1 and 21080.3.2, if a lead agency has not previously done so, before approving a cultivation project and, where applicable, implement mitigation measures as required in PRC Section 21082.3. In addition, indoor cultivation activities typically occur within developed urban and industrial environments that tend to have diminished potential for the presence of tribal cultural resources.

Utilities and Service Systems

Indoor cultivation sites often involve the use of municipal utilities and infrastructure for water supplies, wastewater discharges, and stormwater runoff. However, without knowing where indoor cultivation may be concentrated under this alternative, it is unknown whether it would require or result in the construction of new or expanded water treatment facilities. In general, compliance with local land use planning and zoning would address water supply needs. Likewise, cannabis cultivation facilities would not generate large volumes of stormwater or wastewater sufficient to require the construction or expansion of stormwater or wastewater facilities. In particular, indoor facilities could generate stormwater from impervious roof areas but would not include large parking lots or other impervious surfaces. It is also assumed that jurisdictions would plan for adequate wastewater treatment capacity to accommodate approved operations through their general plan and zoning processes.

5.6.3 No High-Intensity Grow Light Alternative

Aesthetics

Under the No High-Intensity Grow Light Alternative, outdoor and mixed-light cultivation would have similar impacts to those described for these cultivation types under the Proposed Program. Indoor cultivation, which would not be allowed under this alternative, does not generally have great potential for adverse aesthetic impacts; as such, this alternative would not substantially decrease any aesthetic effects compared to the Proposed Program.

Agriculture and Forestry Resources

Similar to the Proposed Program, limiting cultivation to outdoor and mixed-light techniques would have no potential for conversion of farmland to non-agricultural use or conflict with existing zoning for agricultural use or Williamson Act contracts because cannabis cultivation is recognized as an agricultural use by the State.

However, outdoor and mixed-light cultivation techniques are typically sited in rural settings compared to indoor cultivation. Therefore, the potential for this alternative to result in conversion of forest land to nonforest use would be greater than that of the Proposed Program. Licensees would still be required to follow all laws and regulations of local jurisdictions and CAL FIRE, such that impacts would not be significant.

Air Quality

The No High-Intensity Grow Light Alternative would limit growers to the use of natural light, eliminating the use of high-energy equipment used in indoor and some mixed-light cultivation operations. As a result, this alternative would substantially reduce air emissions compared to the Proposed Program. Odors generated by the No High-Intensity Grow Light Alternative would be similar to those of the Proposed Program.

Biological Resources

Outdoor and mixed-light cultivation sites are typically located within less developed rural and agricultural settings, which tend to have greater biological value than more developed locations. As a result, this alternative, compared to the Proposed Program, would have greater potential for impacts on biological resources. However, as with the Proposed Program, compliance with existing laws and regulations protecting biological resources would ensure that impacts are not significant.

Cultural Resources

Outdoor and mixed-light cultivation activities typically occur within undeveloped rural and agricultural settings, which have greater potential for the presence of cultural resources compared to indoor cultivation sites. As a result, this alternative, compared to the Proposed Program, would have greater potential for impacts on cultural resources. Similar to the Proposed Program, this alternative would require that local jurisdictions issuing licenses comply with CEQA. Should ground-disturbing activities and/or site development for the establishment of cannabis cultivation take place, licensees would be required as part of this alternative to conduct studies to identify significant cultural and paleontological resources in or adjacent to the licensed premises and develop mitigation measures according to State CEQA Guidelines Section 15126.4(b), if any such resources were identified.

Energy Use and Greenhouse Gas Emissions

Eliminating the use of high-intensity grow lights for cultivation would result in a large decrease in energy use and GHG emissions. This would reduce potential for wasteful or inefficient use of energy or substantial levels of GHG emissions compared to the Proposed Program. This may be slightly offset by transportation emissions, as outdoor cultivation

activities are more likely to occur in rural, undeveloped areas, requiring more vehicle miles traveled to transport cannabis and cannabis products to urban or suburban markets. Additionally, the reduced impacts of this alternative would be offset somewhat by the use of more heavy machinery in outdoor cultivation, such as chainsaws, mowers, or tractors that would create emissions. The expected levels of vehicle and equipment emissions, however, are far lower than those resulting from the use of high-intensity grow lights.

Hazards, Hazardous Materials, and Human Health

Under this alternative, impacts from routine transport, use, and disposal of hazardous materials; accidental upset or release of hazardous materials; and/or potential impacts on nearby sensitive resources (such as schools and airports) would be similar to those of the Proposed Program.

Under the No High-Intensity Grow Light Alternative, fire and health risks associated with indoor cultivation from grow lights, potential for mold, and elevated CO_2 levels would be greatly reduced. As such, impacts from this alternative would be less than those of the Proposed Program.

Hydrology and Water Quality

Under this alternative, impacts on hydrology and water quality may be slightly greater than under the Proposed Program because outdoor and mixed-light operations are more likely to be located in undeveloped rural areas that may rely on streamflow as a water supply and/or have open areas subject to soil erosion. By comparison, indoor operations more frequently use municipal stormwater, wastewater, and water supply systems. However, outdoor and mixed-light cultivation operations under this alternative would be subject to the same regulatory requirements as under the Proposed Program, which would ensure that impacts on hydrology and water quality would not be significant.

Land Use and Planning

Impacts related to land use and planning as a result of the No High-Intensity Grow Light Alternative would be similar to those of the Proposed Program. Under this alternative, as with the Proposed Program, licensed cultivators would be required to conduct their activities in accordance with State and local laws and regulations, including local land use plans, local coastal programs, and zoning ordinances. Issuance of licenses by CDFA would be subject to local approval and, therefore would not conflict with existing zoning and land use compatibility requirements set forth by individual local jurisdictions.

Noise

Outdoor and mixed-light cultivation activities would generate greater temporary noise levels than indoor cultivation, as discussed in Section 4.10, *Noise*. That said, more cultivation would occur in less densely populated areas with fewer sensitive receptors, compared to indoor cultivation. Cultivators would still be required to comply with local requirements related to noise, such as noise ordinances. Overall, impacts would be similar to those of the Proposed Program.

Public Services

Under the No High-Intensity Grow Light Alternative, impacts on police protection services, schools, parks, and other public facilities would be similar to those of the Proposed Program. It is unlikely that any increase in demand for public services would necessitate the construction of new or expanded facilities. This alternative would meet statutory requirements to ensure that cultivation sites are prohibited within 600 feet of schools, reducing the potential for conflicts with school operations. Similar to the Proposed Program, it would be speculative to predict population growth in any particular location to such an extent that it would result in increased demand for schools, parks, or other public facilities. Such needs would be addressed by local jurisdictions on a case-by-case basis and would be subject to CEQA and other environmental regulations.

In addition, by prohibiting use of high-intensity grow lights, this alternative would eliminate the fire risks associated with indoor cultivation. This would reduce some potential demand for fire protection services. Therefore, impacts related to fire protection services may be less than those of the Proposed Program.

Transportation and Traffic

Under this alternative, impacts on transportation and traffic would be similar to those of the Proposed Program. Cultivation of cannabis would not generate substantial vehicle trips; while the vehicle miles traveled may be greater due to the increased potential that the activity would occur in remote, rural areas, the extent of this change would be difficult to predict. The alternative would not conflict with circulation plans, ordinances, or policies; substantially conflict with congestion management programs; result in substantial change to air traffic patterns; result in significant impacts on emergency access; or result in significant impacts on bicycle and pedestrian access and public transit. While the location of traffic associated with cultivation may shift depending upon the locations of outdoor and mixed-light cultivation compared to those of indoor sites, cultivators would be required to comply with policies of local jurisdictions and to consider and address site-specific issues such as ingress/egress, parking, and other requirements.

Tribal Cultural Resources

Similar to the Proposed Program, this alternative would require that CDFA consult with Native American tribes under PRC Sections 21080.3.1 and 21080.3.2, if the lead agency has not previously done so, before approving a cultivation project and, where applicable, implement mitigation measures as required in PRC Section 21082.3. Impacts would be similar to those of the Proposed Program.

Utilities and Service Systems

Similar to the Proposed Program, outdoor and mixed-light cultivators would be subject to regulatory requirements related to use of water, stormwater discharges, and management of wastewater. As with the Proposed Program, this alternative would not require or result in the construction of new or expanded water treatment facilities. Likewise, cannabis cultivation facilities would not generate large volumes of stormwater or wastewater sufficient to require the construction or expansion of stormwater or wastewater facilities. In

particular, outdoor cultivation facilities may include undeveloped land that would allow rainwater to infiltrate into the soil rather than generate runoff. Local jurisdictions would plan for adequate wastewater and stormwater treatment capacity to accommodate approved operations through their general plan and zoning processes.

5.6.4 Restricted Size Alternative

Aesthetics

Under the Restricted Size Alternative, cultivation sites would generally cover less area than those of the Proposed Program. In general, compared to the Proposed Program, smaller facilities would have reduced potential for impacts on surrounding visual quality and character, as they would be less visible in comparison to their surroundings in long-range views. However, there could be an increased number of such operations, which could collectively offset this effect. Impacts would be similar to those of the Proposed Program.

Agriculture and Forestry Resources

Similar to the Proposed Program, this alternative would not result in the conversion of farmland to non-agricultural use or conflict with existing zoning for agricultural use or Williamson Act contracts. Sites located in forest land could result in timber conversion, albeit at a smaller level on a per-site basis due to size restrictions; however, there could be a greater number of small cultivation sites overall, which may offset this impact. Overall, impacts would be similar to those of the Proposed Program.

Air Quality

Average air pollutant emissions per site from the Restricted Size Alternative would be less than those of the Proposed Program, as the area of each cultivation site would be smaller and, therefore, generally would require less energy. This may be offset by an increased number of these smaller sites, which collectively may have similar emissions to the Proposed Program. Odor impacts, similarly, may be less on a per-site basis but may not be reduced overall.

Biological Resources

While smaller cultivation operations would have less potential to adversely affect biological resources on a per-site basis, collectively, the impacts would be similar to those of the Proposed Program. Compliance with applicable laws and regulations would ensure that such impacts would not be significant.

Cultural Resources

While smaller cultivation operations would have less potential to adversely affect cultural resources on a per-site basis, collectively, the impacts would be similar to those of the Proposed Program. As part of the local approval process, licensees would be required to conduct studies to identify significant cultural and paleontological resources in or adjacent to the licensed premises and develop mitigation measures according to State CEQA Guidelines Section 15126.4(b), if any such resources were identified.

Energy Use and Greenhouse Gas Emissions

While smaller cultivation operations would typically use less energy and have decreased GHG emissions, there could be a larger number of these smaller sites, which collectively would use a similar amount of energy. Therefore, energy use and GHG emissions under this alternative would be similar to that of the Proposed Program.

Hazards, Hazardous Materials, and Human Health

Under this alternative, impacts from routine transport, use, and disposal of hazardous materials; accidental upset or release of hazardous materials; and/or potential impacts on nearby sensitive resources (such as schools and airports) would be similar to the Proposed Program. While sites would be restricted in size, impacts associated with indoor cultivation equipment would be similar to those of the Proposed Program, which would be addressed through adherence to building, electrical, and fire codes and providing notifications to first responders.

Hydrology and Water Quality

Under the Restricted Size Alternative, impacts on hydrology and water quality would be similar to or slightly less than those of the Proposed Program, given that sites would be restricted in size and, therefore, may require a smaller water supply and result in reduced stormwater runoff. Compliance with existing regulatory programs would ensure that these impacts would be less than significant.

Land Use and Planning

Impacts related to land use and planning as a result of the Restricted Size Alternative would be similar to those of the Proposed Program. Under this alternative, as with the Proposed Program, licensed cultivators would be required to conduct their activities in accordance with State and local laws and regulations, including local land use plans, local coastal programs, and zoning ordinances. Issuance of licenses by CDFA would be contingent upon local approval and, therefore should not conflict with existing zoning and land use compatibility requirements set forth by local jurisdictions.

Noise

Under the Restricted Size Alternative, factors affecting the level of noise generated would be similar to those outlined for the Proposed Program. It is unclear whether a restriction of size would lead to a reduced usage of equipment or a reduction in the overall production of noise and vibration. Therefore, it is speculative to reach a conclusion regarding noise impacts of this alternative.

Public Services

Under the Restricted Size Alternative, impacts on police and fire protection services, schools, parks, and other public facilities would be similar to those of the Proposed Program. Restricting the size of cultivation sites would not meaningfully change demands for public services and facilities. This alternative would meet statutory requirements to ensure that

cultivation sites are prohibited within 600 feet of schools, reducing the potential for conflicts with school operations. Similar to the Proposed Program, it would be speculative to predict population growth in any particular location to such an extent that it would result in increased demand for schools, parks, or other municipal facilities or services. Such needs would be addressed by local jurisdictions on a case-by-case basis, and would be subject to CEQA and other environmental regulations.

Transportation and Traffic

Under this alternative, impacts on transportation and traffic would be similar to those of the Proposed Program. Cultivation of cannabis would not generate substantial vehicle trips; conflict with circulation plans, ordinances, or policies; substantially conflict with congestion management programs; result in substantial changes to air traffic patterns; result in significant impacts on emergency access; or result in significant impacts on bicycle and pedestrian access and public transit. Cultivators would be required to comply with policies of local jurisdictions and to consider and address site-specific issues such as ingress/egress, parking, and other requirements.

Tribal Cultural Resources

Similar to the Proposed Program, this alternative would require that CDFA consult with Native American tribes under PRC Sections 21080.3.1 and 21080.3.2, if a lead agency has not previously done so, before approving a cultivation project and, where applicable, implement mitigation measures as required in PRC Section 21082.3. In general, because sites would be restricted in size, there would be less potential to disrupt existing tribal cultural resources at any given location, although a larger number of cultivation sites could offset this.

Utilities and Service Systems

Restricting the size of cultivation sites would not substantially change demand for utilities and service systems from cannabis cultivation. Similar to the Proposed Program, this alternative would avoid potential for impacts associated with wastewater discharges and possible exceedances of wastewater treatment requirements by requiring applicants to demonstrate compliance with applicable water quality orders and waste discharge requirements. As with the Proposed Program, this alternative would not require or result in the construction of new or expanded water treatment facilities. In general, compliance with local land use planning and zoning would address water supply needs. Likewise, cannabis cultivation facilities would not generate large volumes of stormwater or wastewater that would require the construction or expansion of stormwater or wastewater facilities. In particular, outdoor facilities may include undeveloped land that may allow rainwater to infiltrate into the soil rather than generate runoff. Local jurisdictions would plan for adequate wastewater and stormwater treatment capacity to accommodate approved operations through their general plan and zoning processes. Impacts would be similar, in general, to those of the Proposed Program.

5.7 Environmentally Superior Alternative

Considering all environmental aspects, the Proposed Program is considered to be environmentally superior to any of the alternatives. It strikes a balance between the various

environmental issues and ensures that, with limited exceptions, impacts would not be significant. It is important to note that the California State Legislature and the voters, in adopting MCRSA and AUMA, respectively, directed CDFA to develop regulations, specifically to address environmental impacts of unpermitted cultivation, and these considerations have guided the development of the Proposed Program.

From among the alternatives, the No High-Intensity Grow Light Alternative is considered environmentally superior. This alternative would focus cultivation activities on outdoor and mixed-light techniques using natural lighting and would prohibit indoor cultivation and some mixed-light cultivation techniques that rely solely or partially on high-intensity grow lights. Therefore, this alternative would lead to a substantial reduction in energy use and related air quality and GHG emissions associated with indoor cultivation. It would also avoid the various fire and health risks associated with indoor cultivation. Because indoor cultivation typically occurs in more urban settings, impacts in these locations may be reduced, although if they were replaced with outdoor or mixed-light cultivation in urban settings, this could create greater security issues, as these operations are easier to detect. The No High-Intensity Grow Light Alternative could also result in other adverse environmental impacts. Outdoor and mixed-light cultivation sites are typically located in more rural settings, with greater potential for aesthetic impacts, forestland conversion, and effects on biological resources, cultural resources, hydrology and water quality, noise, and tribal cultural resources. However, compliance with Proposed Program requirements, other applicable laws and regulations, and requirements from local jurisdictions would ensure that such impacts would not be significant.

The other alternatives were not selected as the environmentally superior alternative for the following reasons:

No Program Alternative. Because a greater number of unpermitted cultivators would continue to operate under this alternative, it would result in impacts due to noncompliance with requirements related to water use, use of illegal pesticides, waste disposal, and illegally obtained energy. In addition, the activities of lawful growers would not benefit from the implementation of environmental protection measures contained within the Proposed Program regulations. As a result, impacts would be greater overall than those of either the Proposed Program or the No High-Intensity Grow Light Alternative (the Environmentally Superior Alternative), including the significant impacts on cultural resources and tribal cultural resources, rendering this alternative less environmentally desirable.

No Natural Light Alternative. This alternative would avoid potential impacts associated with outdoor and mixed-light cultivation techniques, which rely on natural light, and instead would encourage the use of indoor cultivation techniques that utilize artificial lighting. This would generally lead to a reduction of impacts in more rural settings, where outdoor and mixed-light cultivation is much more common. These reduced impacts may include issues such as aesthetics, biological resources, cultural resources, hydrology and water quality, forest conversion, noise, and tribal cultural resources. However, the No Natural Light Alternative could also result in other adverse environmental impacts. Because indoor cultivation methods rely heavily on high-intensity grow lights and other equipment to regulate indoor artificial environments, this alternative would result in greater impacts related to energy use, air quality, and GHG emissions. Additionally, indoor practices are much more commonly associated with fire and other health risks,

such as elevated levels of mold and CO_2. These offsetting adverse effects from a potential increase in indoor cultivation as a result of restricting outdoor and mixed-light cultivation render this alternative less environmentally desirable than either the Proposed Program or the No High-Intensity Grow Light Alternative (the Environmentally Superior Alternative).

Restricted Size Alternative. This alternative would generally reduce potential impacts at any given site but there may be a larger number of sites, which may collectively have similar impacts to the Proposed Program. It is unclear whether this alternative would reduce the Proposed Program's significant impacts on cultural resources or tribal cultural resources. Therefore, this alternative was not selected as environmentally superior as it did not deviate meaningfully from the Proposed Program and would not avoid the substantial impacts addressed by the No High-Intensity Grow Light Alternative (the Environmentally Superior Alternative).

Chapter 6
Cumulative Considerations

6.1 Introduction

This chapter presents the setting for the cumulative impacts analysis and characterizes the significance of cumulative impacts to which the California Department of Food and Agriculture's (CDFA's) CalCannabis Cultivation Licensing program (Proposed Program) may contribute. According to the California Environmental Quality Act (CEQA) Guidelines, Section 15130(a)(1), a cumulative impact is created by the combination of a proposed project (or, in this case, a proposed program) with other past, present, and probable future projects (or programs) causing related impacts. Cumulative impacts can result from individually minor, but collectively significant, projects taking place over a period of time (State CEQA Guidelines Section 15355[b]). Under CEQA, an Environmental Impact Report (EIR) must discuss the cumulative impacts of a project when the project's incremental contribution to the group effect is "cumulatively considerable." An EIR does not need to discuss cumulative impacts that do not result, in part, from the project evaluated in the EIR.

To meet the adequacy standard established by State CEQA Guidelines Section 15130, an analysis of cumulative impacts must contain the following elements:

- An analysis of related past, present, and reasonably foreseeable projects or planned development that would affect resources in the project area similar to those affected by the proposed project;
- A summary of the environmental effects expected to result from those projects, with specific reference to additional information stating where that information is available; and
- A reasonable analysis of the combined (cumulative) impacts of the relevant projects.

The cumulative impacts analysis must evaluate a project's potential to contribute to the significant cumulative impacts identified, and it must discuss feasible options for mitigating or avoiding any contributions determined to be cumulatively considerable.

The discussion of cumulative impacts is not required to provide as much detail as the discussion of the effects attributable to the project alone. Rather, the level of detail is to be guided by what is practical and reasonable.

6.2 Methods Used in this Analysis

6.2.1. Approach to Analysis

The following analysis of cumulative impacts focuses on whether the impacts of the Proposed Program would be cumulatively considerable within the context of impacts resulting from the Proposed Program and other related past, present, or reasonably foreseeable future projects or programs. The cumulative impact scenario considers other projects and programs proposed within the geographic area defined for each resource topic that would have the potential to contribute to significant cumulative impacts.

State CEQA Guidelines Section 15130 provides the following two alternative approaches for analyzing and preparing an adequate discussion of significant cumulative impacts:

- the list approach, which involves listing past, existing, and probable future projects or activities that have produced, or would produce, related or cumulative impacts, including, if necessary, those projects outside the control of the lead agency; or
- the projection approach, which uses a summary of projections contained in an adopted local, regional, or statewide plan, or related planning document, that describes or evaluates conditions and their contribution to the cumulative effect.

This evaluation utilizes a hybrid approach. The list approach has been used to describe cannabis-related activities other than those that would occur under the Proposed Program, and a projection approach has been used for non–cannabis-related activities that could contribute to cumulative impacts.

Activities related to the Proposed Program that are included in the cumulative impacts analysis were determined using several factors, including the location and type of activity and the characteristics of the activity related to resources that could be affected by the Proposed Program. In addition, regional conditions that might lead to cumulative impacts (e.g., air pollutant emissions) are also described.

6.2.2. Resource Topics Considered and Dismissed

The Proposed Program has the potential to contribute to cumulative impacts related to the following resource topics: aesthetics; agriculture and forestry resources; air quality; biological resources; hazards, hazardous materials, and human health; hydrology and water quality; noise; public services; transportation and traffic; and utilities and service systems. Impacts relating to greenhouse gas (GHG) emissions are intrinsically a cumulative issue and are already addressed in Section 4.6, *Energy Use and Greenhouse Gas Emissions*; therefore, this topic is not discussed further in this chapter. All other resource topics (Table 6-1**)** have been dismissed from consideration in the analysis of cumulative impacts for one of the following reasons: either significant cumulative impacts do not exist, the Proposed Program would not have the potential to make a considerable contribution to any significant cumulative impacts, or insufficient information exists to reach a conclusion regarding these topics without significant speculation. As a result, these resource topics are not discussed further in this chapter.

Table 6-1. Resource Topics Dismissed from Further Consideration in the Analysis of Cumulative Impacts

Resource Topic	Rationale for Dismissal
Cultural Resources	Information has been not found during preparation of the Program EIR (PEIR) to suggest that a widespread loss or degradation of significant cultural or historic resources has occurred or would occur in the future in California as a result of cannabis cultivation activities licensed under the Proposed Program. Rather, impacts on significant cultural and historic resources from other past, present, and probable future projects and programs would be localized and would affect only the immediate resources in question. The activities to be carried out under the Proposed Program would have limited potential to affect cultural resources and would be highly unlikely to affect any individual cultural resource that is, or may be in the future, subject to significant cumulative impacts. For this reason, the Proposed Program would not have the potential to make a considerable contribution to any cumulative impacts related to cultural resources.
Geology, Soils, and Seismicity	The Proposed Program would not expose individuals to increased geologic or seismic hazards, would not result in erosion or the loss of topsoil, would not construct structures on unstable soils, and would not create wastewater systems in unsuitable soils. Therefore, the Proposed Program would not have the potential to make a considerable contribution to any cumulative impacts related to geology, soils, or seismicity.
Land Use and Planning	The Proposed Program would not result in any permanent land use changes that could conflict with land use plans, policies, or regulations adopted to avoid or mitigate an environmental effect. All cultivation activities conducted under the Proposed Program would be required to obtain any necessary authorizations from the relevant land use authority and (where applicable) property owner and to comply with any applicable laws or policies specific to the area. Therefore, the Proposed Program would not have the potential to make a considerable contribution to any cumulative impacts related to land use and planning.
Mineral Resources	No information has been found during the preparation of this PEIR to suggest that a widespread loss or degradation of mineral resources has occurred or would occur in the future in the cumulative scenario for the Proposed Program. Rather, impacts on mineral resources from other past, present, and probable future projects and programs would be localized and would affect only the immediate resources in question. All cultivation activities conducted under the Proposed Program would be required to obtain any necessary authorizations from the relevant land use authority or property owner and to comply with any applicable laws or policies specific to the area. Local municipalities are responsible for the conservation (i.e., protection from incompatible land uses) of areas designated as having substantial potential for mineral extraction and for discouraging development that would substantially preclude the future development of mining facilities in these areas. Therefore, the Proposed Program would not have the potential to make a considerable contribution to any cumulative impacts related to mineral resources.

Resource Topic	Rationale for Dismissal
Population and Housing	Information has not been found during the preparation of this PEIR to suggest that the Proposed Program would result in any population changes, and it would not involve construction of new housing or displace existing housing. In addition, the Proposed Program would not result in construction of infrastructure or include other activities that could indirectly induce or remove an obstacle to population growth. The Proposed Program would not cause adverse effects related to population growth or housing demand. Therefore, the Proposed Program would not have the potential to make a considerable contribution to any cumulative impacts related to population and housing.
Recreation	As described above, the Proposed Program would not cause an increase in population, and therefore would not lead to population growth that would create the need for new recreational facilities and/or contribute to the deterioration or alteration of any existing recreational facilities. Licensed cultivation operations would not be located within public recreation areas and would not affect use of any recreation areas. Therefore, the Proposed Program would not have the potential to make a considerable contribution to any cumulative impacts related to recreation.
Tribal Cultural Resources	Information has not been found during the preparation of the PEIR to suggest that widespread loss or degradation of tribal cultural resources has occurred or would occur in the future in California as a result of licensed cannabis cultivation operations. Rather, impacts on tribal cultural resources from other past, present, and probable future projects and programs would be localized and would affect only the immediate resources in question. The activities to be carried out under the Proposed Program would have limited potential to affect tribal cultural resources and would not affect any individual tribal cultural resource that is, or may be in the future, subject to significant cumulative impacts. For this reason, the Proposed Program would not have the potential to make a considerable contribution to cumulative impacts related to tribal cultural resources.

6.2.3. Geographic Scope of Analysis

The level of detail of a cumulative impacts analysis should consider a proposed project's geographic scope and other factors (e.g., a project's construction or operation activities, the nature of the environmental resource being examined) to ensure that the level of detail is practical and reasonable. The scope of individual Proposed Program activities generally would be limited to small geographic areas. However, the overall geographic scope for the purposes of the cumulative impacts analysis is statewide because collectively, Proposed Program activities would have the potential to occur throughout the state. The geographic scope of the cumulative impact analysis for each resource topic is focused on the areas where potential effects of the Proposed Program could contribute to significant cumulative impacts. Error! Reference source not found. defines the geographic scope of the cumulative impacts analysis for resource topics that are evaluated in this chapter.

Table 6-2. Geographic Scope for Resources with Cumulative Impacts Relevant to the Proposed Program

Resource Area	Geographic Scope
Aesthetics	Statewide, at Proposed Program activity locations near sensitive receptors
Agriculture and Forestry Resources	Statewide, at Proposed Program activity locations in agricultural and forested areas
Air Quality	Statewide within each air basin for criteria pollutant emissions, and locally at Proposed Program activity locations near sensitive receptors for toxic air contaminants
Biological Resources	Statewide, at Proposed Program activity locations near special-status species, their habitats, and sensitive natural communities
Hazards, Hazardous Materials, and Human Health	Statewide, at Proposed Program activity locations where impacts to the public could occur
Hydrology and Water Quality	Statewide, at Proposed Program activity locations near water bodies (e.g., lakes, reservoirs, streams, estuaries, Pacific Ocean, groundwater)
Noise	Statewide, at Proposed Program activity locations near sensitive receptors
Public Services	Statewide, at Proposed Program activity locations
Transportation and Traffic	Statewide, at Proposed Program activity locations
Utilities and Service Systems	Statewide, at Proposed Program activity locations

6.3 Cumulative Setting

The cumulative setting considers several categories of activities outside the scope of the Proposed Program that may combine with the effects of the Proposed Program to create significant cumulative impacts, as follows:

- Development of sites for licensed cultivation activities;
- Illegal, unpermitted, and/or unlicensed commercial cultivation and related activities;
- Non-commercial cannabis cultivation activities (i.e., for personal use);
- Commercial cannabis activities licensed by other State agencies (e.g., manufacturing, dispensaries);
- Cannabis consumption; and
- Other activities, not related to cannabis, that may result in similar impacts.

Each of these is described in turn below.

6.3.1. Cultivation Site Development

With the passage of the Medical Cannabis Regulation and Safety Act (MCRSA) and the Adult Use of Marijuana Act (AUMA), and in anticipation of the Proposed Program's implementation, potential license applicants have been, and are likely to continue, performing a variety of site development activities prior to applying for a license under the Proposed Program. While CDFA would issue licenses for cannabis cultivation under the Proposed Program regulations, CDFA does not have discretion or authority over site development or local land use permitting for the purposes of cultivation. For this reason, these site development activities are not considered to be part of the Proposed Program, and their potential impacts have been considered separately from the cultivation activities that would occur in accordance with a State license. Rather, site development is considered here as a past, present, and reasonably foreseeable future related activity, the impacts of which could combine with those of the Proposed Program to create cumulative impacts.

Site development activities may include, but are not limited to, the following:

- Developing a new cultivation site for the purpose of operating that site under the Proposed Program;
- Upgrading or otherwise modifying an existing cultivation site to bring that site into compliance with all applicable local, State, and federal regulations; permitting programs; and requirements, including those of the Proposed Program; and/or
- Modifying an existing site's design or facilities to support the cultivator's planned activities; for example, modifications allowing the site to operate under multiple or combination licenses in one particular location.

Typical activities associated with cultivation site development are described further below. Because Proposed Program applicants must have obtained all other required State and local permits and approvals prior to applying for a license from CDFA under the Proposed Program, in many cases these site development activities would have taken place prior to applying for a license from the State.

In most cases, site development activities would require review and approval by the local jurisdiction in which the activity is located. To guide the approval process for site developments, as described in Section 4.9, *Land Use and Planning*, local jurisdictions are required to develop and periodically update long-range planning documents called general plans, which serve as a blueprint for the future planning and growth of cities and counties. General plans set forth local development policies, objectives, principles, and standards specific to a given local jurisdiction. Many general plan policies are intended to reduce or minimize significant environment effects associated with site development and land use. Through these plans and zoning codes, local jurisdictions would typically provide guidance, restrictions, and conditions of approval on siting locations, such as consideration of the impacts of siting cannabis cultivation operations in a given location, as well as the potential impacts of multiple cannabis cultivation sites in an area considering other related or unrelated projects in that area. Compliance with applicable land use plans overseen by local and State agencies, along with related CEQA compliance evaluations, would help to address potential impacts of cultivation site development. Such land use plans could include, but are not limited to, general plans, specific plans, zoning and other local ordinances (including those pertaining specifically to cannabis cultivation), and other relevant plans and policies

such as Local Coastal Programs. In addition, even if certain site development activities are otherwise permitted by right within a given jurisdiction, a developer must comply with local grading and building regulations.

A number of other regulatory requirements would potentially apply to site development, including:

Water Quality Permitting. Permits administered by the State Water Resources Control Board (SWRCB) and Regional Water Quality Control Boards (RWQCBs) specific to cannabis cultivation (including site development for cultivation), construction activity, and municipal stormwater discharges contain stormwater management and other requirements to minimize the potential for erosion or discharge of other contaminants to water bodies.

State Threatened, Endangered. *Candidate and Rare Species*: the California Department of Fish and Wildlife (CDFW) has discretionary authority over activities that could result in the "take" of any species listed as candidate, threatened, endangered, or rare species pursuant to the California Endangered Species Act (CESA) (Fish and Game Code Section 2050 et seq.) and the Native Plant Protection Act (NPPA) (Fish and Game Code Section 1900 et seq.). CDFW generally considers adverse impacts on CESA- and NPPA-listed species, for the purposes of CEQA, to be significant without mitigation. Take of any CESA- or NPPA-listed species is prohibited except as authorized by state law (Fish and Game Code Sections 2080 and 2085; Title 14 of the California Code of Regulations [CCR], Section 786.9[b]). Consequently, if a site development project, including project construction or any project-related activity during the life of the project, results in take of CESA- or NPPA-listed species, CDFW recommends that the project proponent seek appropriate authorization prior to project implementation. This may include an Incidental Take Permit or a Consistency Determination in certain circumstances (Fish and Game Code Sections 2080.1 and 2081).

Rivers, Lakes, and Streams. An entity may not substantially divert or obstruct the natural flow of; substantially change, or use any material from the bed, channel, or bank of; or dispose of any debris, waste, or other material into, any river, stream, or lake unless certain conditions are met. For such activities, the entity must provide written notification to CDFW. Based on the written notification and site-specific conditions, CDFW will determine if the activity may substantially adversely affect an existing fish or wildlife resource and issue a Lake or Streambed Alteration Agreement to the entity that includes reasonable measures necessary to protect the resource (Fish and Game Code Section 1600 et seq.).

Fully Protected Species. CDFW has jurisdiction over fully protected species of birds, mammals, amphibians, reptiles, and fish pursuant to Fish and Game Code Sections 3511, 4700, 5050, and 5515. Take of any fully protected species is generally prohibited and CDFW cannot authorize take except in limited circumstances such as under the authority of the Natural Community Conservation Planning (NCCP) Act (Fish and Game Code Section 2800 et seq.).

Birds. CDFW has jurisdiction over actions that may result in the disturbance or destruction of nests or the unauthorized take of birds. Fish and Game Code Sections 3503, 3503.5, and 3513 prohibit the following: unlawful take, possession, or needless destruction of the nest or eggs of any bird; unlawful take, possession, or destruction of any birds of prey or their nests or eggs; and unlawful take of any migratory nongame bird.

Furbearing Mammals. CDFW has jurisdiction over furbearing mammals pursuant to 14 CCR Section 460. This section states, "[f]isher, marten, river otter, desert kit fox, and red fox may not be taken at any time," and therefore CDFW cannot authorize their take.

Water Pollution. It is unlawful to deposit in, permit to pass into, or place where it can pass into the "Waters of the State" any of the following: (1) petroleum, acid, coal or oil tar, lampblack, aniline, asphalt, bitumen, or residuary product of petroleum, or carbonaceous material or substance; (2) refuse, liquid or solid, from any refinery, gas house, tannery, distillery, chemical works, mill, or factory of any kind; (3) sawdust, shavings, slabs, or edgings; (4) any factory refuse, lime, or slag; (5) *Cocculus indicus*; or (6) any substance or material deleterious to fish, plant life, mammals, or bird life (Fish and Game Code Section 5650). "Waters of the state," "waters of this state," and "state waters" have the same meaning as "waters of the state" as defined in subdivision (e) of Section 13050 of the California Water Code (Fish and Game Code Section 89.1.). "Waters of the state" means any surface water or groundwater, including saline waters, within the boundaries of the state.

Dredge or Fill Activities. Site development that would result in temporary or permanent dredge or fill to Waters of the U.S. (e.g., for a road crossing) would be required to obtain a Clean Water Act Section 404 permit from the U.S. Army Corps of Engineers, which would contain requirements to ensure that the functions and values of Waters of the U.S. are not reduced. This would be accompanied by a Clean Water Act Section 401 water quality certification from the RWQCB that such dredge or fill activities would not violate any state water quality standards or beneficial uses.

Other. A number of other federal, State, and local regulatory requirements would apply to site development that would be infeasible to comprehensively list here.

The following discussion focuses on site development for outdoor, mixed-light, and indoor cultivation activities; site development activities for nursery and processing operations are not specifically addressed, but those license types may require any of the activities described in the following sections.

Development of Outdoor and Mixed-Light Cultivation Sites

Site development for outdoor and mixed-light cultivation would typically involve basic land preparation activities, including, but not limited to, tree and vegetation removal for the clearing of land, as well as land terracing and grading, described below in "Staging Areas and Site Preparation." Outdoor and mixed-light cultivation construction activities may also require the construction of roads, irrigation systems and water storage facilities, parking, security lighting, and landscaping and fencing, also described below.

For mixed-light (and some outdoor) cultivation, greenhouse or hoop house[1] structures are typically used. These structures are often constructed with a frame of heavy-duty polyvinyl chloride (PVC) or metal pipes and clear plastic tarps as coverings. Glass may be used instead of tarps. Site development may also involve construction or modification of other ancillary structures such as storage buildings or residences.

Development of Indoor Cultivation Sites

Indoor site development activities may involve the construction of new buildings or the refurbishment/modification of existing buildings or parcels to meet the equipment and facility needs for indoor cultivation and to comply with applicable regulations. Modifications of existing buildings would largely occur within the interior of the structure, including changes to the facility layout; creation of additional rooms indoors to allow for separated cultivation phases; upgrades or replacement of the electrical, heating, ventilation, and air conditioning (HVAC), and plumbing systems; and installation of equipment (high-intensity grow lights, movable platforms for plants, security systems). Exterior modifications could include land clearing and grading (especially for development of new structures), installation of infrastructure for connection to municipal utilities, water storage, water and stormwater treatment, parking, security lighting, and landscaping and fencing.

Access Roads, Parking, and Vehicle Trips

Access roads and parking may need to be developed or modified to allow for access to a cultivation site. In some cases, these could require grading or construction activities near or across streams, installation of culverts, and/or placement of fill within the water body. Access roads and parking areas may be paved or unpaved. During site development, vehicle trips to and from the site would be needed for workers, materials deliveries, and off-hauling, largely dependent on the size, type, and location of the development activity.

Staging Areas and Site Preparation

Development of new cultivation sites may require the use of heavy equipment to perform site clearing (vegetation removal and soil preparation) and grading. In some cases, demolition and removal of existing structures and other infrastructure may also be necessary. Similar activities may be needed for modification of existing sites. Staging areas for the storage of construction materials or equipment may be located on site or off site and could involve ground-disturbing activities.

Utility Infrastructure

Development of new cultivation sites or modification/expansion of existing cultivation sites may necessitate the installation of utility infrastructure. This activity could include, but

[1] A hoop house is a series of hoops or bows made of wood, metal or PVC in the shape of a tunnel, covered in greenhouse-type plastic tarps. Like a greenhouse, the interior heats up because incoming solar radiation warms plants, soil, and other objects inside the structure faster than heat can escape the structure. Air warmed by the heat from hot interior surfaces is retained in the structure by the roof and walls.

would not be limited to, the installation of water supply infrastructure (e.g., water storage and irrigation equipment such as water storage ponds, tanks, or reservoirs; groundwater wells; and water treatment equipment), stormwater and wastewater infrastructure, and electrical systems.

Water Supply Infrastructure

Cannabis cultivation sites may require the installation of equipment for the purposes of collecting, diverting, and/or storing water for use in cultivation. This may involve the installation of new or modified surface water intakes, wells, pumps, irrigation lines, and/or water impoundments such as water storage ponds, reservoirs, or tanks. Other water-related equipment for cannabis operations may include hoses, PVC pipes, spray nozzles, and/or drip irrigation equipment. Water treatment equipment can include chemicals, filters, or similar treatment equipment to modify the pH, treat or remove other water pollutants, and/or add nutrients or other chemicals to the water supply for use by the plants. Depending on the water source, cannabis cultivators may need to receive authorization from the SWRCB and/or regional or local permitting authorities, as applicable, for development of water supply facilities and infrastructure.

Stormwater and Wastewater Infrastructure

Cannabis cultivation sites may require the installation of equipment or extension of existing infrastructure for the purposes of controlling discharges of stormwater or wastewater. This may include the installation of piping, culverts, and/or other equipment for stormwater treatment or connection into existing municipal systems for stormwater or wastewater treatment. Construction may also involve the installation of temporary or permanent sanitary facilities (such as portable toilets or septic systems).

Electrical Systems

Wires, utility poles, and other electrical equipment may be necessary to connect cannabis operations to existing electrical sources. Typically, a connection to a local provider's electrical system/network is used as a primary energy source for equipment. Additional energy sources for indoor, mixed-light, and outdoor cultivation may require installation of equipment such as solar panels and backup diesel/gasoline generators. Interior electrical system improvements may include installation of new or additional wiring, panels, and power outlets.

Ancillary Structures

Other ancillary structures such as residential homes, offices, security systems (e.g., fencing and gates, lights), storage sheds, and perimeter fencing may be constructed and used in conjunction with cannabis cultivation site development.

6.3.2. Unlicensed Cultivation and Related Activities

Commercial cannabis cultivation has been illegal in the United States since the early 20th century and despite a trend toward legalization at the state level, it remains illegal at the

federal level; marijuana is classified by the federal government as a Schedule 1 narcotic. While the Proposed Program provides a regulatory framework for cultivation under California law, some cultivators may elect not to participate in the Proposed Program but still continue to cultivate cannabis without a State license. This circumstance is defined in this document as "unlicensed cultivation." In particular, those cultivating for export outside of the state would not be able to obtain a license under the Proposed Program. The *Standardized Regulatory Impact Assessment* (SRIA; ERA Economics 2017) anticipates that the number of unlicensed cultivators in the state supplying cannabis to the illegal export market would remain unchanged under the Proposed Program, but that many of the unlicensed cultivators producing cannabis for in-state consumption would become licensed. For the purposes of this analysis, unlicensed cultivation also includes cultivators who have sought or obtained licenses under the Proposed Program but subsequently operate out of compliance with their license and/or Proposed Program requirements.

The cumulative setting for the Proposed Program acknowledges the potential existence of unlicensed cultivation operations and considers the potential impacts of the Proposed Program given the underlying past, present, and foreseeable future unlicensed cannabis market.

The characteristics of cultivation activities, and challenges more commonly associated with unlicensed cultivation in comparison to licensed cultivation, are described below.

Unlicensed Cultivation Locations and Setting

While unlicensed cultivation sites are often operated at locations and within settings similar to those described for licensed sites, the desire to avoid detection by local, State, or federal enforcement agencies encourages unlicensed cultivators to conduct cultivation activities in more remote, undeveloped areas, such as California's Coast Ranges, Klamath Mountains, and Sierra Nevada foothills, or to otherwise disguise their cultivation sites. Unlicensed cannabis production in California is often centered in sensitive watersheds with relatively high biodiversity and often in habitats of rare State-listed and federally listed species (Carah et al. 2015). Grow sites are sometimes clustered in steep locations, far from developed roads, with potential for substantial water consumption, and near habitats for special-status species (Butsic and Brenner 2016). Unpermitted cannabis cultivation activities may occur on private, public (State or federal [e.g., U.S. Forest Service and National Park Service]), and tribal lands.

Site Development Activities

Unlicensed cultivators often perform site development activities to establish new or modified cultivation sites, similar to those described above for licensed cultivators in Section 6.2.1, "Cultivation Site Development." However, site development activities by unlicensed cultivators are less likely to be in compliance than licensees with applicable local, State, and federal requirements, such as those related to building codes, human health and safety, biological resources, water quality and water supplies, air quality and GHG emissions, and cultural and tribal cultural resources because cultivators must demonstrate compliance with each of these requirements prior to obtaining a license.

Some examples of environmentally damaging activities typically related to unlicensed cannabis cultivation are unpermitted deforestation and conversion of forest land, construction of unregulated water diversions, and unapproved ties into electric utility systems. Construction of unpermitted river and lake diversions for the irrigation of cannabis crops have reportedly resulted in reduced water flows and the dewatering of streams and rivers, contamination of watersheds, and alteration of watersheds and natural water courses (U.S. Department of Justice, National Drug Intelligence Center [NDIC] 2007; Gabriel et al. 2013). Unauthorized clearing of land for construction of unlicensed cultivation operations can destroy wildlife and wildlife habitat; critically damage parks, streams, and lakes; and lead to erosion into water bodies (Warren 2015, Gabriel et al. 2013, NDIC 2007). Illegal indoor cultivation operations may have exposed wiring, terminals, or connections onsite due to substandard modifications to a structure's electrical system (Gustin 2010, Durbin 2016). Unauthorized diversion of electrical service, which has been commonly observed at indoor cultivation operations, may make it difficult or impossible for firefighters to effectively cut off power to an operation before entering (Gustin 2010).

Use of Hazardous Chemicals

Common practices at unlicensed cannabis cultivation sites involve the use or generation of hazardous pollutants that may enter streams, other surface waters, and groundwater and create a risk of exposure to these materials for people and wildlife. This includes the use of various pesticides not authorized for use on cannabis, improper disposal of trash and chemicals, haphazard management of human waste, and substandard storage of hazardous materials such as diesel and gasoline (Gabriel et al. 2013, North Coast [NC] RWQCB] 2013, Central Valley RWQCB [CVRWQCB] 2014). Additionally, fertilizers and pesticides used at cultivation sites are often mixed directly in the water source, thereby contaminating streams (SWRCB et al. 2014).

Intrastate, Interstate, and International Transport

Unlicensed cultivators distribute their products to various locations, including exports to other states and countries. These activities involve transport by drivers and, sometimes, support for safe houses for the drivers and for product storage en route (ERA Economics 2017).

Security, Crime, and Theft

A defining feature of cannabis cultivation—historically and currently—is the existence of substantial security, legal, and production risks. Unlicensed cultivators risk incarceration and fines if they are caught and are subject to other security risks from managing a business that involves large amounts of cash because banking is unavailable. While licensed cultivation activities typically involve security measures (refer to Chapter 3, *Proposed Program Activities*), security for unlicensed operations often involves additional measures to avoid detection and prevent theft. In addition to those typical security measures described in Section 3.2.61, "Staffing and Security," security measures employed by unlicensed operations have included the following:

- Locating a cultivation operation in a remote or prohibited area, including federal or State public lands, or tribal lands;

- Barbed-wire fencing or electrically charged fencing around the property;
- Land mines (Live Science 2014); and
- Weapons, armed personnel, and/or dogs on the site.

Thefts are most common during the final stages of cannabis production (after harvesting and drying). According to the SRIA prepared for the Medical Cannabis Cultivation Program (MCCP; ERA Economics 2017), losses due to theft can average 2 percent of harvest costs.

6.3.3. Non-commercial Cannabis Cultivation

Under MCRSA and previous state law (e.g., Proposition 215), qualified patients can cultivate up to 100 square feet of cannabis plants without a license, and caregivers are allowed to cultivate up to 500 square feet of cannabis plants without a license. Under AUMA, adults over 21 years of age are allowed to cultivate up to six plants without a license. Outdoor non-commercial cannabis cultivation is subject to local restrictions and requirements; for instance, many municipalities limit cultivation to indoor areas; under AUMA, indoor cultivation cannot be prohibited.

In general, the activities associated with non-commercial cannabis cultivation (and related site development) are similar to those conducted for commercial cannabis cultivation, albeit on a smaller scale. Potential for noncompliance with applicable laws and regulations may be greater than licensed commercial cultivation, due to a lack of knowledge on the part of the cultivator and/or lack of a mechanism to ensure compliance.

6.3.4. Commercial Cannabis Activities Licensed by Other State Agencies

Under both MCRSA and AUMA, other State agencies would continue to operate existing licensing programs and/or are in the process of developing licensing programs. The Proposed Program's cumulative setting includes potential cumulative impacts related to these existing and future programs.

In addition, applicants participating in multiple programs (i.e., both medical and adult-use [nonmedical]), or obtaining combinations of multiple licenses (e.g., cultivation and other license types) may directly or indirectly result in cumulative changes to the environment. The Proposed Program's cumulative setting also includes these multiple programs and combinations of licenses.

Other Licensing Programs

The following State agencies are in the process of establishing licensing programs to regulate and enforce policies, procedures, and regulations for medical and adult-use (nonmedical) cannabis production, distribution, and usage in California under MCRSA and AUMA.

Bureau of Marijuana Control

Following development of its licensing program as required under MCRSA, the Bureau of Marijuana Control (BMC, formerly Bureau of Medical Cannabis Regulation (BMCR)), will issue licenses for distributors, testing laboratories, dispensaries, transporters, and producing dispensaries of medical cannabis and medical cannabis products. In addition, as required under AUMA for adult-use (nonmedical) cannabis, BMC will issue licenses for distributors, retailers (dispensaries), and microbusinesses (a vertically integrated license type that includes cultivation, manufacturing, distribution, and/or retail sale). This licensing program will utilize the track-and-trace system established by CDFA to document the transport path of plants from cultivation to testing, distribution, transport, and ultimately retail sale of cannabis products.

BMC is expected to begin accepting license applications in 2018, with a focus on ensuring that cannabis testing, distribution, transport, retail sale, and microbusiness activities would be performed in a manner that protects the environment, workers, and the general public from the individual and cumulative effects of these operations and fully complies with all applicable laws and regulations.

While some BMC licensees may engage in site development activities, most licensed operations are anticipated to use existing facilities, in some cases modifying them for their intended purpose. Distributors and transporters would generate traffic as part of transporting cannabis to various locations within the State.

California Department of Public Health

Assembly Bill 243 requires the California Department of Public Health (CDPH) to develop standards for the production and labeling of all manufactured medical cannabis products. In addition, CDPH will issue licenses to manufacturers of cannabis products under MCRSA and AUMA and to testing laboratories under AUMA. As with CDFA and BMCR, CDPH is expected to begin accepting applications for licenses on January 1, 2018.

CDPH currently administers the Medical Marijuana Identification Card (MMIC) program, which issues identification cards to qualified patients that allow patients to use cannabis for medical purposes in accordance with Senate Bill 420 (adopted in 2003). To qualify for the program, a patient must be diagnosed with a serious medical condition and obtain a physician's recommendation that the use of medical cannabis is appropriate for them (CDPH 2016a). Various activities of the MMIC program are carried out by participating counties, including processing applications for identification cards, collecting fees from applicants, issuing the State-produced identification cards, and maintaining county records (CDPH 2016b). As of 2015, 56 of California's 58 counties were participating in the program (CDPH 2015a). From its inception in 2004 through October 2015, more than 84,000 MMICs were issued (CDPH 2015b).

Multiple Licenses

An individual licensee may hold multiple commercial cannabis licenses, including licenses in separate license categories, subject to restrictions in MCRSA and AUMA. It is possible that procurement of multiple licenses and implementation of operations that conduct multiple

businesses or types of operations—whether multiple types of cultivation operations or multiple types of businesses within the larger cannabis industry (e.g., manufacturing, processing, or distributing)—may result in combined impacts that exceed those associated with an individual license. These potential impacts are considered here within the cumulative setting.

6.3.5. Cannabis Consumption

Cannabis commerce activities licensed under MCRSA and AUMA, as well as non-commercial and unlicensed cannabis production, ultimately result in consumption of cannabis and cannabis products for medical and nonmedical purposes. Consumption of cannabis and cannabis products may have certain medical benefits, as well as certain adverse impacts.

Medical Benefits of Cannabis Consumption

Cannabis has been approved for medical use in California since the passage of Proposition 215 by voters in 1996. Proposition 215 allowed doctors to recommend the use of cannabis to patients for treatment of cancer, anorexia, AIDS, chronic pain, spasticity, glaucoma, arthritis, migraine, or any other illness for which cannabis provides relief. Much of the available information regarding the medical benefits of cannabis for certain conditions is anecdotal; however, a growing body of scientific research exists on the medical use of cannabis.

Anecdotal evidence suggests that components of cannabis—specifically, certain cannabinoids and terpenes—may have therapeutic benefits for a range of medical conditions. Tetrahydrocannabinol (THC) has been reported to provide analgesic, anti-spasmodic, anti-tremor, anti-inflammatory, and appetite stimulant properties (GWPharmaceuticals 2016). Cannabidiol (CBD) has been reported to provide anti-inflammatory, anticonvulsant, antioxidant, neuroprotective, and antipsychotic properties (GWPharmaceuticals 2016). Terpenes are reported to have anti-inflammatory, memory enhancement, analgesic, anti-anxiety, sleep aid, treatment of acid reflux, and anti-depressant benefits (Alchimia Blog 2014). Other reported effects of terpenes include a synergistic interaction between cannabinoids and terpenoids (amplifying the beneficial effects of CBD), inhibitory interactions, and increased assimilation of THC. Terpenes may affect the two main neurotransmitters that regulate mood and behavior, dopamine and serotonin (ProjectCBD 2016, Alchimia Blog 2014).

In early 2017, the National Academy of Sciences (NAS) published a comprehensive review of existing evidence regarding the health effects of using cannabis or its constituents. The authors reviewed more than 10,000 abstracts and studies and developed conclusions regarding the potential therapeutic effects of cannabis use, as well as adverse health effects. The NAS study concluded that there was substantial evidence that cannabis use had certain medical benefits for patients. In adults with chemotherapy-induced nausea and vomiting, the review found, oral cannabinoids are effective anti-emetics. Adult patients with chronic pain who were treated with cannabis or cannabinoids were likely to experience a clinically significant reduction in pain symptoms. In adults with multiple sclerosis (MS)–related spasticity, the short-term use of oral cannabinoids improved patient-reported spasticity

symptoms. The NAS study was unable to make definitive conclusions for other health conditions, citing inadequate information.

Pesticide Residues and Contaminants

Pesticide residues and contaminants in cannabis may lead to adverse health effects among cannabis users. Cannabis cultivators may use pesticides to control threats such as invasive pest species (e.g., spider mites), plant pathogens, and fungi (e.g., powdery mildew). MCRSA and AUMA require that all cannabis flowers and cannabis products must be tested at a licensed testing laboratory prior to consumer sale. The implementing regulations by BMC (medical) and CDPH (adult use) will establish maximum allowable levels of pesticide residues and other contaminants that may be present. While these regulations will help reduce human health risks due to pesticide exposure, some potential impacts could remain.

One factor that may influence health risks to cannabis users relates to the amount of cannabis that may be consumed. At present, there is no accepted industry standard "dose" for cannabis consumption, whether by inhalation, ingestion, or topical use. Consumers may smoke or vape as much cannabis as they desire or eat any quantity of edibles they see fit, despite proposed State standards for dosing on edibles and proposed labeling requirements for cannabis or cannabis products. As an example, an edible cannabis product is permitted to be sold containing up to 2 parts per million (or micrograms [µg] per gram [g]) of benzene; a consumer who eats 4 grams of the product per day would consume 8 µg of benzene, which would exceed the No Significant Risk Level for cancer of 6.4 µg/day established under Proposition 65 (Safe Drinking Water and Toxic Enforcement Act). Without standard dosing for all cannabis products, it is difficult to predict levels of exposure and the resulting potential for risk.

Additionally, data are scarce on the effects of pyrolysis (i.e., changes in chemical form from exposure to heat, such as through smoking or vaping) on pesticides as they relate to human health. Most research on pesticide toxicity is based on oral ingestion exposure, and these data are used for determining acceptable dietary exposure based on pesticide residues in crops. Inhalation exposure through smoking, however, presents a different set of risks than oral ingestion. Research demonstrates that chemical residues present on cannabis transfer directly into the mainstream smoke and ultimately to the end user. Inhaled chemicals enter the bloodstream without first undergoing first-pass metabolism by the digestive and hepatic systems, as happens with ingested chemicals. As a result, inhaled chemicals are typically present at much higher levels in the body than those that are orally ingested (Voelker and Holmes 2014). Pesticides on cannabis can be transferred into cannabis smoke with efficiencies as high as 70 percent (Sullivan et al. 2013). In addition, smoking cannabis can create pyrolysis compounds with unknown toxicities (Voelker and Holmes 2014). Few data are available on human health effects from pyrolyzed, inhaled pesticide residues.

Consumers may also be at increased risk of exposure to pesticides when consuming concentrated cannabis goods because the levels of pesticides found in concentrates are higher than levels found in flowers. Levels of pesticide residue in concentrates are higher because solvents used to concentrate cannabinoids (e.g., butane, pentane, carbon dioxide [CO_2] extraction) also concentrate the accompanying pesticides (Voelker and Holmes 2014). While cannabis flowers and commercially manufactured cannabis products are required to be tested for pesticides and contaminants prior to consumer sale, it is foreseeable that some

consumers would be exposed to concentrated cannabis products that have not been tested if consumers purchase flowers and create their own extractions, or if residential cultivators or unlicensed producers or manufacturers create cannabis extracts for consumption.

Adverse health effects may also result from exposures to pesticides that are unlawful or unregulated. For example, licensed cannabis cultivators could use pesticide products that are not listed in the MCRSA or AUMA testing regulations and, therefore, might not be detected in the required cannabis testing. Observations of existing medical cannabis cultivation operations conducted during preparation of this Draft PEIR indicated that some cultivators are using pesticide products that are not authorized for use on cannabis, such as triflumizole, cyhalothrin, thiabendazole, ethephon, and carbendazim. Non-commercial cultivators or unlicensed producers might similarly use any number of pesticide products or introduce other harmful contaminants into cannabis or cannabis products, and these individuals would generally not conduct laboratory testing to determine the concentration of substances in their products.

Health Effects of Smoke Inhalation

While all forms of cannabis consumption may expose consumers to adverse health effects associated with contaminants in cannabis and cannabis products, particular health concerns exist regarding inhalation of cannabis smoke. In 2009, "marijuana smoke" was listed on the Proposition 65 list of cancer-causing chemicals after a California Office of Environmental Health Hazard Assessment (OEHHA) Science Advisory Board declared that it had been "clearly shown through scientifically valid testing according to generally accepted principles to cause cancer" (OEHHA 2009). The report states that cannabis smoke and tobacco smoke share many of the same characteristics with regard to chemical composition and toxicological properties, including at least 33 individual constituents present in both substances that are also listed as carcinogens under Proposition 65. The OEHHA report concluded that cannabis smoke inhalation has statistically significant associations with cancers of the lung, head and neck, bladder, brain, and testis.

The American Lung Association (ALA) has openly warned the public about the dangers of smoking cannabis, advertising on its website that smoke is harmful to human health whether it is from burning wood, tobacco, or cannabis because toxins and carcinogens are released from the combustion of materials (ALA 2015). The ALA further claims that the combustion of cannabis smoke contains many of the same toxins, irritants, and carcinogens as tobacco smoke. The ALA also notes that cannabis is also commonly inhaled deep into the lungs, resulting in a higher probability that tar and chemicals could affect the lungs. Research shows that inhaling cannabis smoke can lead to conditions such as bronchitis, chronic cough, phlegm production, and a weakened immune system, which is especially dangerous to people with already compromised immune systems.

The American Cancer Society (ACS) advises against the smoking of cannabis because high tar and carcinogen concentrations pose a risk to human health (ACS 2016). According to the ACS, it has been difficult to conduct accurate studies on the impacts of cannabis because the substance has been illegal for so long; in addition, it is difficult to rule out the effects of potential tobacco use in study subjects. The ACS recommends that further research is needed to fully understand the cancer risks associated with cannabis use.

It is important to note that research into health impacts due to cannabis smoking is far from complete. For example, OEHHA and other sources acknowledge the potential for concurrent use of tobacco and cannabis is possible; as a result, the potential that adverse health outcomes may be caused by one or both of these materials and impacts cannot be solely attributed to one or the other. Also, because of the largely illicit nature of cannabis use, study subjects may not have accurately reported their consumption and, as a result, the correlation between consumption and health outcomes may not always be accurate.

The 2017 NAS study cited above examined the body of available scientific literature and found that no statistically significant link between smoking cannabis and an increased risk of lung, head, and neck cancer in adults. The study did find modest evidence that cannabis use is associated with one subtype of testicular cancer. In addition, the NAS study identified some adverse health effects attributed to smoking of cannabis. In particular, smoking cannabis on a regular basis was found to be associated with chronic cough and phlegm production, and quitting cannabis smoking was likely to reduce chronic cough and phlegm production. The NAS study did not find sufficient evidence to determine whether cannabis use is associated with chronic obstructive pulmonary disorder, asthma, or worsened lung function (NAS 2017).

Note that inhalation of second-hand cannabis smoke or cannabis vapor may lead to similar outcomes. This is particularly of concern in instances where nonsmokers may have exposure, such as children being exposed to the smoke generated by adults or worker exposure in smoking or vaping lounges at dispensaries. AUMA allows for such lounges; MCRSA is silent on the topic.

Injury and Death

Another potential impact of cannabis consumption is the increased incidence of injury and death as a result of cannabis use, most notably from motor vehicle accidents. In 2011, motor vehicle crashes were the leading cause of death among U.S. adolescents and adults ages 16-25 years (National Highway Traffic Safety Administration [NHTSA] 2015). Among all age groups, motor vehicle crashes in 2014 resulted in more than 32,000 fatalities and more than 2 million nonfatal injuries in the United States (Centers for Disease Control and Prevention [CDC] 2016, NHTSA 2016). Recent or acute cannabis consumption can slow reaction time and ability to make decisions, impair coordination, distort perception, and lead to memory loss and difficulty in problem solving (NAS 2017, CDC 2017.). The NAS study found substantial evidence that cannabis use before driving increases the risk of being involved in a motor vehicle accident (NAS 2017). Recent studies indicate that the risk of impaired driving associated with cannabis in combination with alcohol appears to be greater than the risk from using either substance alone (CDC 2017).

In 2016, the AAA Foundation for Traffic Safety published a study analyzing the prevalence of cannabis involvement in fatal crashes in Washington State between 2010 and 2014. An average of 10 percent of all drivers involved in fatal crashes during that period had detectable THC levels in their blood at the time of the crash, although this does not necessarily mean that they were impaired by cannabis at the time. There was evidence that the proportion of drivers in fatal crashes who were positive for THC increased after Washington's Initiative 502 legalized recreational use of cannabis for adults aged 21 years and older; however, the increase was not immediate and appeared to have begun

approximately 9 months after the effective date of Initiative 502. In 2014, both the number and proportion of drivers in fatal crashes who were positive for THC were more than double the averages from the previous 4 years (Tefft et al. 2016).

Other Adverse Effects

Potential adverse health impacts may result from unintentional consumption of cannabis, particularly by children. Children may mistake edible cannabis products (e.g., gummy bears, brownies, lollipops) for regular food and eat the products unknowingly. Small children are at higher risk of a severe reaction than adults based on their size and weight. Because some edible products have highly concentrated amounts of cannabis compounds, the effects are more severe on a small child. In children, the most common symptoms reported after acute cannabis ingestion are lethargy, coma, inability to walk, and vomiting (NAS 2017). The NAS study found moderate evidence of a statistical association between cannabis use and increased risk of overdose injuries, including respiratory distress, among pediatric populations in states where cannabis is legal (NAS 2017).

Some studies have also suggested links between cannabis smoking by pregnant mothers and adverse effects on their offspring, including preterm birth, stillbirth, and low birth weight (Gunn 2016, National Institute on Drug Abuse [NIDA] 2017, World Health Organization [WHO] 2017). However, much of the existing literature is inconclusive. The NAS study concluded that there is substantial evidence of a statistical association between maternal cannabis smoking and lower birth weight of the offspring (NAS 2017).

There is also evidence that cannabis use may have adverse psychiatric effects in some users. Recent studies have indicated that cannabis use may increase the incidence of psychiatric disorders such as anxiety and psychosis or may increase users' risk for schizophrenia, depression, or bipolar disorder (Health Canada 2013, Wisconsin State Council on Alcohol and Other Drug Abuse 2016, NIDA 2017, WHO, 2017). The NAS study found substantial evidence of a statistical association between frequent cannabis use and the development of schizophrenia or other psychoses, with the highest risk among the most frequent users. The study also found moderate evidence that regular cannabis users diagnosed with bipolar disorder were likely to have increased symptoms of mania and hypomania. The study also noted evidence that cannabis use resulted in a small increased risk for the development of depressive disorders (NAS 2017).

6.3.6. Other (Non–Cannabis-Related) Activities with Similar Impacts

This section describes the types of past, existing, and probable future activities in California not related to cannabis that have resulted in, or may be expected to result in, impacts similar to those of the Proposed Program and that could combine to create cumulative impacts. Because a wide variety of activities could generate such effects, this discussion focuses broadly on projections related to population growth, development, and commerce within the state, including issues such as urbanization and other forms of land use conversion. These activities could have adverse effects related to the full range of environmental topics, from physical resources (water quality, air quality) to social resources (aesthetics, noise, traffic, exposure to hazardous substances) to biological resources (loss of natural habitats for native species).

California encompasses about 100 million acres of land surface, of which about 5 percent has been converted to urban and suburban uses (U.S. Census Bureau 2010). **Table 6-3** shows the projected population changes in California counties from 2016 to 2060 (California Department of Finance [CDOF] 2013, 2016). Nearly all counties are expected to experience population growth, and some counties are expected to experience greater than 100 percent growth.

Table 6-3. Projected California Population Changes by County (2016–2060)

County	2016	2060	Change	County	2016	2060	Change
Alameda	1,627,865	1,675,011	2.9%	Orange	3,183,011	3,331,595	4.7%
Alpine	1,166	1,147	-1.6%	Placer	373,796	579,729	55.1%
Amador	37,707	45,116	19.6%	Plumas	19,879	19,471	-2.1%
Butte	224,601	341,850	52.2%	Riverside	2,347,828	4,216,816	79.6%
Calaveras	45,207	63,025	39.4%	Sacramento	1,495,297	2,191,508	46.6%
Colusa	21,948	40,179	83.1%	San Benito	56,648	86,939	53.5%
Contra Costa	1,123,429	1,585,244	41.1%	San Bernardino	2,139,570	3,433,047	60.5%
Del Norte	26,811	32,159	19.9%	San Diego	3,288,612	4,152,763	26.3%
El Dorado	183,750	297,972	62.2%	San Francisco	866,583	926,555	6.9%
Fresno	984,541	1,615,401	64.1%	San Joaquin	733,383	1,538,313	109.8%
Glenn	28,668	40,040	39.7%	San Luis Obispo	277,977	353,190	27.1%
Humboldt	135,116	147,377	9.1%	San Mateo	766,041	928,706	21.2%
Imperial	185,831	355,022	91.0%	Santa Barbara	446,717	519,034	16.2%
Inyo	18,650	23,921	28.3%	Santa Clara	1,927,888	2,198,503	14.0%
Kern	886,507	2,055,622	131.9%	Santa Cruz	275,902	309,474	12.2%
Kings	150,373	282,305	87.7%	Shasta	178,592	265,246	48.5%
Lake	64,306	110,055	71.1%	Sierra	3,203	3,876	21.0%
Lassen	30,780	41,961	36.3%	Siskiyou	44,739	52,646	17.7%
Los Angeles	10,241,335	11,562,720	12.9%	Solano	431,498	634,852	47.1%
Madera	155,349	373,929	140.7%	Sonoma	501,959	616,340	22.8%
Marin	262,274	272,275	3.8%	Stanislaus	540,214	953,580	76.5%
Mariposa	18,159	23,308	28.4%	Sutter	97,308	254,783	161.8%
Mendocino	88,378	102,106	15.5%	Tehama	63,934	109,201	70.8%
Merced	271,579	553,114	103.7%	Trinity	13,667	19,381	41.8%
Modoc	9,638	10,321	7.1%	Tulare	466,339	836,850	79.5%
Mono	13,721	20,755	51.3%	Tuolumne	54,900	63,947	16.5%
Monterey	437,178	569,459	30.3%	Ventura	856,508	1,034,651	20.8%
Napa	142,028	196,243	38.2%	Yolo	214,555	305,711	42.5%
Nevada	98,095	150,550	53.5%	Yuba	74,345	168,685	126.9%
				Total (State)	**39,255,883**	**52,693,579**	

Sources: CDOF 2013, 2016

Between 1984 and 2012, more than 1.4 million acres of agricultural land in California were converted to nonagricultural purposes. About 78 percent of this land became urbanized, while 21 percent was converted to miscellaneous other land uses (including habitat restoration) and 1 percent was converted to create new water bodies (California Department of Conservation 2015)

Similarly, between 1969 and 1998, approximately 113,000 acres of private timberland in California were converted to other uses (California Department of Forestry and Fire Protection [CAL FIRE] 2002). Restrictions on timberland conversion and regulatory programs such as the Forest Tax Reform Act of 1976, which helps keep forestlands in timber production by reducing assessed property taxes, have stabilized forestland acreage over the last two decades (U.S. Forest Service 2008). Urban development, however, continues to put pressure on landowners and land managers to convert forestlands to more profitable uses (CAL FIRE 2010).

Key outcomes of population growth, urbanization, land development, and commerce related to environmental resource topics covered in this PEIR include the following:

- Changes in visual character and quality in various locations within the state;
- Past and future conversion of agricultural and forest lands to other land uses;
- Increased potential for emissions of construction-related and operational air pollutants and toxic air contaminants into the environment;
- Loss of habitat for native and special-status species, and effects on sensitive natural communities, including riparian areas and wetlands;
- Increased potential for releases (both intentional and unintentional) of hazardous materials into the environment, including potential for accidents (e.g., accidental spills) affecting humans and the environment;
- Creation of new point-source discharges (e.g., wastewater treatment plants, industrial activities) and non-point-source runoff (e.g., vehicles, roadways), as well as increased quantity of runoff resulting from the addition of impervious surfaces;
- Increasingly noisy environments in developing and urbanized areas;
- Increased demands for police protection, fire protection, and other public services, resulting in the need for new or expanded facilities; and
- Increased traffic and related effects on transportation infrastructure.

6.4 Cumulative Impacts Analysis

6.4.1. Aesthetics

As discussed in Section 6.2.1, "Cultivation Site Development," activities such as construction of new cannabis cultivation facilities, modifications to existing facilities, construction of related ancillary facilities (e.g., residences), and other related construction work (e.g., access

roads and staging areas) to support cultivation activities—many of which are anticipated to be licensed under the Proposed Program—have occurred, are occurring presently, and are anticipated to continue in the future. Site development has the potential to have substantial temporary and/or permanent effects on existing scenic vistas, scenic resources, designated State scenic highways, and/or the existing visual character or quality of a particular site and its surroundings. Additionally, construction of new facilities and modifications to existing facilities could involve use of additional lighting that could create impacts on adjacent and nearby properties, residences, and/or motorists traveling on nearby roadways.

Other activities described in the cumulative setting, such as unlicensed cultivation and related site development, other aspects of cannabis commerce (e.g., retail stores), and population growth and development within the state in general, could lead to similar aesthetic impacts.

These activities, in combination with cultivation activities that would occur under the Proposed Program, could result in a potentially significant cumulative impact on aesthetic resources. The extent to which this may occur in any given location would depend on the number, type, and intensity of such activities at that location, the visual resources present in that location, and the presence and sensitivity of receptors near these resources.

As discussed, in Section 4.1, *Aesthetics*, the determination of a substantial adverse impact, or in this case an adverse cumulative impact, on visual resources depends heavily on the existing visual baseline of a given location, the proposed changes from baseline associated with a particular cultivation operation, the proximity to available viewsheds and sensitive receptors, the related viewer sensitivities, and the perception and opinions of viewers regarding the aesthetic quality of the cannabis cultivation operation. For example, while unlicensed cannabis operations could have potential impacts on aesthetic resources, these sites are typically conducted in remote areas where the activities can exist unnoticed by law enforcement and, as a result, visual sensitivity by sensitive receptors would generally be low. Details necessary to determine whether a substantial cumulative impact has occurred or may occur at a particular location is generally not available, and it would not be feasible to evaluate such a site-specific impact in this PEIR.

The Proposed Program does not involve construction, modification, or replacement of cannabis cultivation facilities. Considered on a programmatic level, these activities themselves would not result in substantial adverse impacts on aesthetic resources. Furthermore, to the extent that the Proposed Program would result in previously unlicensed cultivators becoming licensed, the adverse aesthetic effects of ongoing cultivation activities may be reduced due to compliance with local requirements designed to protect visual resources within a community. For these reasons, the Proposed Program's contribution to cumulative aesthetic impacts would not be considerable and would be considered **less than significant**.

6.4.2. Agriculture and Forestry Resources

As described in Section 6.3.6 above, conversion of agricultural lands to nonagricultural uses is occurring throughout the state as a result of population growth, urbanization, and other land uses. While cannabis cultivation itself is an agricultural activity, site development for cultivation may involve the conversion of areas of farmland to nonagricultural uses, such as

for ancillary structures not directly related to cultivation (e.g., residences). Other forms of cannabis commerce may require site development that converts farmland to nonagricultural uses.

As also described in Section 6.3.6 above, conversion of forest land throughout the state has not been as extreme, and the acreage of forested lands in California has generally stabilized. Development of sites that involve forest clearing for cannabis cultivation would, in their entirety, represent conversion to nonforest uses.

Based on the trends presented in Table 6-3, conversion of agricultural lands to other uses is expected to continue to increase in the future. Conversion of agricultural land in the state is considered a significant cumulative impact. Such trends are not as problematic for forestland, and it has been concluded that the conversion of forestland is not a significant cumulative effect. Because no significant cumulative impact exists to which the Proposed Program could contribute related to forest conversion, this issue is not discussed further. It also bears noting that the Proposed Program, by providing a path to licensing, may reduce pressure for illicit conversion of forestland to cultivation.

Cannabis cultivation under the Proposed Program would represent an agricultural activity and, as such, the Proposed Program would not result in the conversion of agricultural lands to nonagricultural uses. Therefore, the Proposed Program would make no contribution to cumulative impacts related to conversion of agricultural lands.

In conclusion, the Proposed Program's contribution to conversion of agricultural and forest land would not be considerable, and this impact is considered **less than significant**.

6.4.3. Air Quality

Criteria Pollutant Emissions

Several air basins throughout the state are in nonattainment status for a variety of air pollutants. Nonattainment status is the result of a combination of emissions sources, with no single source typically of sufficient magnitude to cause nonattainment. The various emissions sources described in Section 6.2, "Cumulative Setting," would contribute to such exceedances of national ambient air quality standards and/or California ambient air quality standards. As growth and development continue in the state, additional emissions would have the potential to exacerbate this condition or cause exceedances of standards in locations that are currently in attainment. Air quality plans and control programs have been developed by local air districts that are intended to maintain attainment status or improve conditions in instances of nonattainment. Implementation of these plans and programs is overseen by the California Air Resources Board, which prepares a State Implementation Plan that includes emissions reduction measures to be implemented over time related to a variety of sectors and emissions sources. Regardless, the ongoing nonattainment status for some basins/pollutants and the potential for new instances of nonattainment are considered a significant cumulative impact.

Under the Proposed Program, the volume of cannabis production in the state is anticipated to remain virtually unchanged (ERA Economics 2017). However, some unlicensed cultivators would become licensed under the Proposed Program. Licensed cultivators (both

new and existing) would be prohibited from using generators as a main energy source, and indoor cultivators would be required to reduce their GHG emissions to a level that would be in alignment with statewide GHG reduction goals. To the extent that these cultivators are not already following them, these requirements would result in a reduction in criteria pollutant emissions compared to baseline conditions, representing a beneficial impact with respect to criteria pollutant emissions. Other emissions sources—such as mobile-source emissions—would not substantially change under the Proposed Program. As such, the contribution of the Proposed Program to cumulative impacts related to criteria pollutant emissions and attainment status would not be considerable, and this would be considered a beneficial impact.

Toxic Air Contaminants

Exposure to toxic air contaminants (TACs) is a localized issue; cumulative impacts would be possible in instances where a receptor or group of receptors could be exposed to multiple sources of TACs. The extent to which cumulative impacts may result from TAC exposures would be based on site-specific conditions, considering all sources of TAC emissions, including those associated with cannabis cultivation activities. Given the site-specific nature of the issue and the uncertainty regarding the exact locations where licensed cannabis cultivation would occur, it is difficult to determine whether significant cumulative impacts exist or whether the Proposed Program may contribute to them. Moreover, because the overall extent of cannabis production is expected to remain unchanged under the Proposed Program (ERA Economics 2017) and licensed cultivators would be required to implement practices that would reduce TAC emissions, such as not using generators as a main source of power, the Proposed Program's contribution would generally not be considerable, even in instances where there were significant cumulative impacts. For these reasons, this impact is considered less than significant.

Odors

As with TACs, odors are a localized issue, depending on factors such as the size and type of cultivation activity and the proximity of the activity to sensitive receptors, and the extent to which the odors generated during cannabis cultivation are considered a nuisance is a subjective determination. As such, the extent to which there may be significant cumulative impacts to which Proposed Program activities may contribute is considered speculative. Based on this uncertainty, this cumulative impact and the Proposed Program's contribution, is not considered further.

Conclusion

Overall, the Proposed Program's contribution to cumulative impacts related to air quality would not be considerable and would be **less than significant**.

6.4.4. Biological Resources

The cumulative impacts on biological resources from unlicensed cannabis cultivation are well documented. Impacts include unauthorized water withdrawals damaging to aquatic life, rodenticide poisoning of special-status species, and clearing of sensitive habitats

(Gabriel et al. 2013, O'Hare et al. 2013, Butsic and Brenner 2016). Unlicensed cultivation operations are generally clandestine and have not been subject to regulatory review. Unlicensed cultivation activities have resulted in significant adverse effects on biological resources throughout the state.

Site development for licensed cannabis cultivation also has the potential for adverse impacts on biological resources, as do other types of development. As the state's population grows, pressure on biological systems is anticipated to increase, and overall impacts on biological resources are considered to be a significant cumulative impact in light of past, present, and reasonably foreseeable future activities. For site development related to cannabis cultivation, such activities would often be subject to local approval and related environmental review, which would help address and reduce potential impacts on biological resources.

In addition, site development must comply with Section 1602 of the Fish and Game Code and must also comply with CESA, which requires incidental take authorization from CDFW prior to take of a species listed as threatened or endangered under this act.

These two regulatory programs (the Lake and Streambed Alteration Program and CESA) have already been described in Section 4.4, *Biological Resources*. However, because of their importance in reducing or avoiding potentially significant impacts on biological resources, their framework and the typical protective measures that they would require are described further here.

Fish and Game Code Section 1602. Under Fish and Game Code Section 1602, an entity may not begin a project that will change the flow or the bed, channel, or bank of a river, stream, or lake without first notifying CDFW about the project ("notification") and, if necessary, obtaining a Lake or Streambed Alteration Agreement from CDFW.

If, after CDFW receives a notification, CDFW determines that the project described therein may have a substantial adverse effect on an existing fish and wildlife resource, CDFW will prepare a draft Lake or Streambed Alteration Agreement that includes measures CDFW has determined are necessary to protect the resource the project may affect (Fish and Game Code Sections 1602, 1603).

"Fish and wildlife," as used in Fish and Game Code Section 1600 et seq., includes fish and wildlife as defined in Fish and Game Code Sections 45 and 89.5, respectively. Specifically, "[f]ish means a wild fish, mollusk, crustacean, invertebrate, amphibian, or part, spawn, or ovum of any of those animals" (Fish and Game Code Section 45). "Wildlife means and includes all wild animals, birds, plants, fish, amphibians, reptiles and related ecological communities, including the habitat upon which the wildlife depends for its continued viability" (Fish and Game Code Section 89.5). Hence, CDFW will include in a Lake or Streambed Alteration Agreement protective measures to protect any plant or animal species a project may adversely affect, rather than only "special-status" species, and any habitat a project may adversely affect. Examples of such protective measures are provided below.

In determining whether a project may have an adverse effect on a fish or wildlife resource, CDFW considers both direct and indirect potential effects.

CESA. Section 2080 of the Fish and Game Code prohibits the take of any species that is state listed as endangered or threatened, or designated as a candidate for such listing. "Take" is defined by Section 86 of the Fish and Game Code as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill" an individual of a listed species (Fish and Game Code Section 86). Under CESA, CDFW may issue an incidental take permit authorizing the take of listed and candidate species that "is incidental to an otherwise lawful activity," provided that "the impacts of the take will be minimized and fully mitigated by including measures in the permit that can be successfully implemented, the applicant ensures adequate funding to implement these measures, and issuance of the permit will not jeopardize the continued existence of the species" (Fish and Game Code Section 2081[b]).

Activities Subject to Fish and Game Code Section 1602 and CESA, and Typical Impacts and Required Protection Measures. Examples of activities that may require notification under Fish and Game Code Section 1602 or may cause prohibited take under CESA include the following: construction of roads and stream crossings (e.g., bridges, culverts, and rock fords), the placement or construction of diversion facilities in or near a stream (e.g., dams, reservoirs, weirs, pumps, wells, and hoses), and the clearing of vegetation.

Common types of impacts on fish and wildlife resources associated with such site development-related activities include a decrease in water quality, flows, and depth; dewatering a stream or parts of a stream; the introduction of or increase in invasive species; interference with breeding, nesting, and wildlife movement; reduction or elimination of nesting and foraging habitat; and the direct loss of fish and wildlife species.

Common types of protection measures CDFW may require include establishing work periods; establishing protocols when working in a wetted stream; locating bridge abutments outside the banks of a stream, if feasible; requiring culverts and other types of stream crossings to meet specific design criteria; requiring screens on diversions that meet specific design criteria; requirements to ensure that instream structures do not impede or prevent the passing of fish up and downstream; prohibiting or requiring certain types of construction materials; replanting vegetation; requiring best management practices to control erosion; establishing decontamination protocols for vehicles; requiring bird nesting and plant surveys; establishing buffers around active bird nests; protection of on-site or off-site compensatory habitat; short- and long-term funding; and establishing monitoring and reporting requirements.

With respect to the Proposed Program, as discussed in Section 4.4, *Biological Resources*, licensed cannabis cultivation itself does not have substantial potential for adverse effects on biological resources, and would be subject to the same CDFW regulatory requirements as described above for site development. In addition, any cultivation activities with potential for significant impacts (including considerable contributions to cumulative impacts) would be required to perform a site-specific environmental review and identify measures to reduce, avoid, or offset these impacts prior to becoming licensed. Finally, as mentioned previously, some existing unlicensed cultivators would become licensed under the Proposed Program (ERA Economics 2017). This could be a beneficial impact on biological resources to the extent that the unlicensed sites may have been causing adverse impacts and now would be required to comply with applicable laws and regulations protecting biological resources.

For these reasons, the contribution of the Proposed Program to cumulative impacts on biological resources would not be considerable, and this impact would be **less than significant**.

6.4.5. Hazards, Hazardous Materials, and Human Health

Cumulative Health Risks of Exposure to Chemicals Used on Cannabis, and Other Factors Related to Cannabis Consumption

Section 6.2.5 describes a range of potential adverse and beneficial health effects that have been attributed to cannabis consumption. In addition to risks associated with cannabis, individuals are exposed to a wide variety of other risks on a day-to-day basis. The U.S. Environmental Protection Agency's (USEPA's) conceptual approach to estimating total exposure and risk, which is termed the "risk cup," considers the aggregate exposure given all exposure pathways and methods of consumption. For example, USEPA believes that about 80 percent of a typical U.S. citizen's pesticide intake occurs through food and that the remaining 20 percent comes from drinking water and residential exposures (Fenske 1999).

The human health risks of greatest relevance to the Proposed Program are those that could occur at a cannabis cultivation site (e.g., through worker exposure or other receptor to pesticides or other hazardous chemicals in use at the cultivation site). This exposure, in combination with other factors such as exposure through other mechanisms, including cannabis consumption, could combine to create a cumulative human health impact.

The extent to which significant cumulative impacts exist to which the Proposed Program could contribute is difficult to determine, as the analysis would be based on individual exposures in a range of different settings and lifestyle patterns. For instance, a cultivation site worker who also consumes cannabis may be at increased exposure risk; similarly, a worker who does not consume cannabis may or may not be exposed to similar risks from other sources (e.g., smoking tobacco).

Furthermore, licensed cultivation does not compel the consumption of cannabis or any other item that may create human health risk. Individuals are able to make their own decisions about whether to consume cannabis and cannabis products, the type of product and mode of consumption, and, with laboratory testing results, the extent to which that product contains chemicals that could pose a health concern.

The screening-level risk evaluation conducted for this PEIR (**Appendix F**) has evaluated a number of pesticides that may be authorized for use in cannabis cultivation. With implementation of the Proposed Program's measures to reduce potential for exposure (e.g., following label requirements), the risk of exposure during cultivation has been determined to be less than significant at a project (i.e., site-specific) level. This, in combination with the uncertainties regarding other forms and levels of exposure and the fact that the Proposed Program does not compel cannabis consumption, leads to the conclusion that the Proposed Program would not make a considerable contribution to cumulative adverse health effects related to cannabis consumption. This impact would be less than significant.

Other Types of Hazardous Materials Exposure

Construction and site development for cannabis cultivation facilities could create hazards to the public and the environment from transport, storage, use, and disposal of hazardous materials (e.g., fuel, solvents). These activities could result in accidental spills or releases of hazardous materials, as well as exposure of workers to toxic constituents, without adequate precautions.

Ongoing unlicensed cannabis cultivation activities are currently having a substantial impact related to hazards and hazardous materials. As described in Section 4.7, *Hazards, Hazardous Materials, and Human Health,* enforcement activities at unlicensed "trespass" grows have found substandard storage practices for hazardous materials (California Department of Fish and Wildlife 2014a, 2014b), and law enforcement officials have observed that toxicants are often dispersed throughout cultivation sites (Gabriel et al. 2013). Additionally, current cannabis cultivation practices in California have been found to include the illegal use of pesticides. Such illegal and improper use, storage, and disposal of hazardous materials endangers cannabis workers and members of the public.

Licenses issued by BMC would not contribute substantially to impacts related to hazards and hazardous materials. In general, distributors, transporters and retail sales of cannabis would not use, store, transport, or dispose of large quantities of hazardous materials. Additionally, compliance with existing laws and regulations would reduce any potential impacts. While manufacturers and testing laboratories may use a variety of hazardous substances, rigorous safety requirements apply to such business operations, preventing the potential for substantial adverse impacts.

As described in Section 6.2.4 above, population growth would increase potential for releases (both intentional and unintentional) of hazardous materials into the environment, including potential for hazardous accidents (e.g., accidental spills) affecting the environment. This increased potential is attributable to the fact that population growth would be accompanied by construction of new buildings, which would involve use of construction equipment and materials containing hazardous materials, as well as potential development of new gas stations or other land uses that store or use hazardous materials.

The contribution of activities conducted under the Proposed Program to any cumulative impacts related to hazards and hazardous materials would not be substantial. As described in Section 4.7, *Hazards, Hazardous Materials, and Human Health,* cannabis cultivation under the Proposed Program would be required to comply with existing laws and regulations related to hazardous materials, such as federal Occupational Safety and Health Administration and California Department of Industrial Relations, Division of Occupational Safety and Health requirements related to worker exposure to toxic materials and, in some cases, Health and Safety Code requirements for preparation of a Hazardous Materials Business Plan.

Additionally, the human health risk screening evaluation prepared for the Proposed Program (Appendix F) found that pesticide use by cannabis cultivators in accordance with Proposed Program requirements would not pose a substantial risk to workers, the environment, or the public.

Cannabis cultivation does have the potential to create risks for firefighters and first responders responding to a fire at an indoor cultivation facility. As described in Section 4.7, indoor cultivation can include or generate several types of hazards to firefighters, such as electrical hazards (e.g., capacitors in high-intensity grow lights); falling, tripping, and entanglement hazards (e.g., wiring, ductwork, and irrigation tubing); explosion hazards (e.g., pressurized CO_2 canisters); mold; oxygen-deficient conditions, and conditions conducive to hazardous fire behavior (e.g., flashover).

In many respects, these hazards are exacerbated by the clandestine nature of many current cannabis cultivation operations, such as with noncompliance with building codes, However, the Proposed Program would reduce hazards for firefighters compared to baseline conditions. Cultivators under the Proposed Program would be required to comply with building, fire, and electrical codes, thereby avoiding many of the hazards currently associated with unlicensed operations.

Overall, the contribution of the Proposed Program to cumulative impacts related to hazards and hazardous materials would not be substantial or considerable. Cannabis cultivation would not include transport, use, or disposal of large quantities of hazardous materials, and fire risks, hazards for firefighters, and other risks would be reduced by compliance with building codes and implementation of requirements in the proposed regulations. Therefore, this impact would be **less than significant.**

6.4.6. Hydrology and Water Quality

Hydrology and water quality impacts could result from past, present, or reasonably foreseeable activities described in Section 6.2, "Cumulative Setting." Cultivation site development would involve land disturbance, potentially resulting in discharges of sediment, nutrients, or other pollutants to receiving waters. However, the construction of legal cultivation sites would be subject to a number of permitting and regulatory requirements to which would minimize discharges of sediment and other construction-related pollutants.

Operations of unlicensed cannabis cultivation sites could result in adverse effects to beneficial uses from surface water diversions, aquifer depletion from use of groundwater, and/or discharges of pesticides and other pollutants associated with cultivation activities.

Non-commercial cannabis cultivation activities would be anticipated to have minimal potential to contribute to any cumulative water quality or hydrology impacts, given the limited extent of these activities in any given location.

Commercial cannabis activities licensed by other State agencies would generate similar hydrology and water quality impacts as those of general development activities throughout the state, including use of water supplies, nonpoint-source runoff, contaminants from vehicle trips to and from the business, etc.

Population growth, urbanization, and land development could result in cumulatively significant impacts due to the creation of new point-source discharges (e.g., wastewater treatment plants, industrial activities) and non-point source runoff (e.g., vehicles), as well as increased quantity of runoff resulting from the addition of impervious surfaces.

In conclusion, significant cumulative impacts exist with respect to hydrology and water quality in the state. This is evidenced by the number of water bodies listed as impaired in the State's Section 303(d) list, which identifies water bodies which cannot assimilate further quantities of the contaminants for which the impairment is listed.

In terms of the Proposed Program's contribution to these cumulative impacts, surface water diversions at licensed cannabis sites would need to receive authorization from SWRCB. As part of the authorization process, SWRCB would establish seasons of diversion and minimum bypass flows to protect instream beneficial uses, and prevent exceedances of water quality standards or other adverse water quality impacts. Licensed cannabis cultivation sites would also be subject to water quality permits for cannabis cultivation activities issued by SWRCB and/or applicable RWQCB, which require the implementation of best management practices to control pollutant discharges.

With the various Proposed Program measures and compliance with other regulatory requirements that protect hydrology and water quality, the contribution of the Proposed Program to significant cumulative impacts would not be considerable. The impact would be **less than significant.**

6.4.7. Noise

Exposure to noise is a localized issue; cumulative impacts would be possible in instances where a receptor or group of receptors could be exposed to excessive noise from multiple sources. The extent to which cumulative impacts may exist would be based on site-specific conditions, considering all noise sources, including those associated with cannabis cultivation activities. In light of the uncertainty regarding many of the exact locations where licensed cannabis cultivation would occur and whether other substantial noise sources exist that could combine to create a cumulative impact, however, it is difficult to determine whether and where significant cumulative impacts could exist or the extent to which the Proposed Program may contribute to them. Moreover, licensed cultivators would be required to comply with local noise standards, which would generally reduce the potential for contributions to cumulative noise impacts. For these reasons, cultivation activities under the Proposed Program would not make a considerable contribution to significant cumulative impacts related to noise. This impact is considered **less than significant**.

6.4.8. Public Services

Police and Fire Protection

Unlicensed cultivation activities currently place substantial demands on law enforcement and, in some instances, fire protection services. Local, State, and federal law enforcement agencies spend considerable time and resources detecting, investigating, and eradicating unpermitted cultivation operations, as well as responding to other crimes associated with cannabis commerce. As described in Section 4.11, *Public Services,* violent crimes associated with unpermitted cannabis cultivation have occurred in California and elsewhere, and some studies have found that cannabis facilities are more likely to experience crime than similar land uses. Unpermitted indoor cultivation operations have resulted in fires, primarily as a result of faulty or substandard wiring and the high electrical loads associated with indoor

growing equipment. While some unlicensed cultivation activities would become licensed following Proposed Program implementation, thereby reducing demand on police and fire protection services, unlicensed activities and associated needs for service from law enforcement and fire protection are expected to continue in the future.

In addition, site development and operation of new, expanded or otherwise modified facilities for licensed commercial cannabis businesses (cultivation and otherwise) have the potential to generate calls for service from fire and law enforcement. For example, construction equipment used during site development could generate sparks and if combined with the use of flammable materials (e.g., fuel), fire risk would increase. Similarly, cannabis businesses could be targeted by criminals due to the high value of cannabis and the current need for cannabis businesses to deal in cash, although the State's licensing requirements include provision of appropriate security measures to reduce this risk.

Population growth, in general, is anticipated to increase demand for police and fire protection services throughout the state, and will result in the need for construction of new or expanded facilities in certain locations. This need is typically addressed through general plan processes, which include planning for public services to accommodate anticipated future growth.

Overall, given the existing demands on police and fire protection services associated with unlicensed cannabis cultivation sites and the anticipated need for increased level of service and related facilities due to population growth throughout the state, a significant cumulative impact exists related to police and fire protection.

That said, cultivation activities under the Proposed Program would reduce the burden on police services, as currently unlicensed operations would obtain licenses and increasingly comply with applicable laws and other requirements. Additionally, by creating a legal pathway for cultivation and allowing for more lawfully grown cannabis to enter the market, the Proposed Program may reduce incentives or opportunities for criminals to engage in unlicensed cannabis cultivation.

The Proposed Program's effect on fire protection service would likely be similar; by requiring licensed facilities to comply with building, electrical, and fire codes, and by potentially reducing the incentive or need for unlicensed indoor grow operations, the Proposed Program would reduce the likelihood of structural fires caused by cultivation activities. Indoor cultivation sites licensed through the Proposed Program would be required to have electrical systems adequate to handle the loads associated with the equipment used in this form of cultivation.

As such, the Proposed Program would make a beneficial contribution to cumulative impacts on police and fire protection by reducing demands that could lead to construction of new or expanded police or fire protection services. Therefore, this impact would be less than significant.

Other Public Services

Cannabis-related businesses would not generally increase demand for parks, schools, or other public services. As such, the Proposed Program would not make any contribution to a

cumulative impact related to the need for construction of new or expanded public facilities, and therefore there would be no impact.

Conclusion

For the reasons described above, the contribution of the Proposed Program to cumulative impacts on public services would not be considerable, and this impact would be **less than significant**.

6.4.9. Transportation and Traffic

Transportation infrastructure is currently strained in many parts of the state, particularly in urbanized areas. Population growth within the state is anticipated to exacerbate these conditions over time, with increased vehicle miles traveled and reduced level of service and/or failure to meet other performance standards and objectives. Development and operation of cannabis-related businesses (both licensed and unlicensed) could contribute to localized impacts on transportation and traffic, depending on the specific location, the amount of traffic generated (e.g., by workers and/or customers), and other traffic-related effects such as temporary lane closures and material/equipment deliveries during construction activities.

Local jurisdictions and regional transportation agencies typically plan for transportation infrastructure improvements to accommodate anticipated growth. However, even with these planning efforts, cumulative impacts related to transportation and traffic in the state are considered significant.

The Proposed Program's contribution to cumulative impacts on transportation and traffic would not be substantial. As described in Section 4.12, *Transportation and Traffic,* a cannabis cultivation operation does not typically employ a large number or high density of employees or involve an unusually large number of material deliveries. Many outdoor and mixed-light cultivation sites are located in remote areas that are not subject to substantial traffic demands. In certain locations, the addition of vehicle trips from cannabis cultivation operations could contribute to adverse effects on affected roadway and intersection operations. However, given the uncertainty regarding the exact locations where licensed cannabis cultivation would occur, it is difficult to determine whether cumulative impacts exist at these locations or whether the Proposed Program may contribute to them. In addition, any cultivation activities with potential for significant impacts (including considerable contributions to cumulative impacts) would be required to perform a site-specific environmental review and identify measures to reduce, avoid, or offset these impacts prior to becoming licensed. Finally, as mentioned previously, some existing unlicensed cultivators would become licensed under the Proposed Program (ERA Economics 2017). This would be beneficial to the extent that the unlicensed sites may have been causing adverse impacts, and now would be part of the planning process for local jurisdictions and regional transit agencies.

For these reasons, the Proposed Program would not make a considerable contribution to cumulative impacts on traffic and transportation, and this impact is considered **less than significant.**

6.4.10. Utilities and Service Systems

Construction and site development activities for new or expanded cannabis cultivation facilities could require additional water supplies (e.g., for dust control, soil conditioning), as well as wastewater service. Additionally, site development would have the potential to disrupt existing underground utilities during ground-disturbing activities or require extension of existing utilities.

Ongoing unpermitted cannabis cultivation activities may divert water from streams without authorization, thereby adversely affecting utilities or water right holders who may obtain water from that source. Unlicensed indoor cultivation also often involves stealing electricity from utilities by tapping electrical lines and bypassing the electrical meter. Although the severity of these impacts may depend on site-specific circumstances, on a statewide level, it seems unlikely that such activities alone would require or result in the construction of new or expanded public facilities.

Licenses issued under the BMC program (e.g., for retail stores) could place demands on existing utilities, such as for water and wastewater service. Again, this is generally not anticipated to require or result in the construction of new facilities when considering impacts on a statewide level.

Population growth in the state would require, over time, the construction of new or expanded water and wastewater facilities, as well as other service systems. In general, this expansion of utilities and service systems to accommodate future growth is planned for through local jurisdictions' general plan processes.

As described in Section 4.14, *Utilities and Service Systems,* the Proposed Program is not anticipated to have a significant adverse effect on utilities and service systems. In many respects, the determination of whether a significant impact would occur would depend on site-specific characteristics (e.g., available water supplies or wastewater treatment system capacity of the local service providers) at the location of cannabis cultivation facilities. Therefore, it is speculative to determine whether and where impacts on specific utilities and service systems may occur from Proposed Program activities.

Overall, cumulative impacts on utilities and service systems from the Proposed Program in combination with the other programs and projects described above would not be substantial and/or are speculative. Water demand, wastewater generation, and solid waste disposal needs resulting from the Proposed Program in combination with other ongoing or future activities could result in impacts, but this would depend on existing conditions at specific, largely unknown locations where cannabis cultivation and other activities would occur. Therefore, this impact would be **less than significant.**

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Chapter 7
Growth-inducing Impacts

Section 15126.2(d) of the State CEQA Guidelines requires an Environmental Impact Report (EIR) to include a detailed statement of a proposed project's (or program's) anticipated growth-inducing impacts. The analysis of growth-inducing impacts must discuss the ways in which a proposed project (or program) could foster economic or population growth or the construction of additional housing in the project area. The analysis also must address project-related actions that, either individually or cumulatively, would remove existing obstacles to population growth. A proposed project (or program) is considered growth inducing if it would induce growth directly (through the construction of new housing or increasing population) or indirectly (by increasing employment opportunities or eliminating existing constraints on development). Under CEQA, growth is not assumed to be either beneficial or detrimental.

The California Department of Food and Agriculture's (CDFA's) CalCannabis Cultivation Licensing program (Proposed Program) would not involve new development that could directly induce population growth, nor would it involve the extension of infrastructure that could indirectly induce population growth. As discussed in Section 4.0 under "Sections Eliminated from Further Analysis," the Proposed Program would not involve construction of new housing or create a demand for additional housing, such as through commercial development.

Based on the results of the Standardized Regulatory Impact Assessment (SRIA), the anticipated statewide net change in employment as a result of the Proposed Program would be an increase of approximately 200 jobs (ERA Economics 2017). Given that this number is very small compared to the overall population of the state, the potential for growth inducement from these additional jobs is not considered meaningful at a statewide level.

However, within individual counties and municipalities that allow commercial cannabis cultivation, potential exists for commercial cannabis cultivation activities to support economic activity and thereby result in population growth. However, any potential adverse effects due to growth at the local level would be handled by individual counties and municipalities through their own planning and local requirements.

Therefore, for the reasons described above, the Proposed Program is anticipated to neither induce growth nor remove obstacles to growth.

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Chapter 8
Glossary and Acronyms

Glossary

Act	The Medical Cannabis Regulation and Safety Act, Business and Professions Code Section 19300 et seq.
Applicant	**Under MCRSA:** Owner or owners of the proposed premises, including all persons or entities having ownership interest other than a security interest, lien, or encumbrance on property that will be used by the premises. If the owner is an entity, "owner" includes within the entity, each person participating in the direction, control, or management of, or having a financial interest in, the proposed premises. If the applicant is a publicly traded company, "owner" means the chief executive officer, or a person or entity with an aggregate ownership interest of 5 percent or more. **Under AUMA:** The owner or owners of a proposed licensee. All persons having (A) an aggregate ownership interest (other than a security interest, lien, or encumbrance) of 20 percent or more in the licensee and (B) the power to direct or cause to be directed, the management or control of the licensee. If the applicant is a publicly traded company, "owner" includes the chief executive officer and any member of the board of directors and any person or entity with an aggregate ownership interest in the company of 20 percent or more. If the applicant is a nonprofit entity, "owner" means both the chief executive officer and any member of the board of directors.
AUMA	Adult Use of Marijuana Act.
Batch or Harvest Batch	A specifically identified quantity of dried flower or trim, leaves, and other cannabis plant matter that is uniform in strain, harvested at the same time, and, if applicable, cultivated using the same pesticides and other agricultural chemicals.
Bureau	Bureau of Marijuana Control within the California Department of Consumer Affairs.

Cannabis	All parts of the plant *Cannabis sativa Linnaeus*, *Cannabis indica*, or *Cannabis ruderalis*, whether growing or not; the seeds thereof; the resin, whether crude or purified, extracted from any part of the plant; and every compound, manufacture, salt, derivative, mixture, or preparation of the plant, its seeds, or resin. Cannabis also means the separated resin, whether crude or purified, obtained from cannabis. Cannabis does not include the mature stalks of the plant, fiber produced from the stalks, oil or cake made from the seeds of the plant, any other compound, manufacture, salt, derivative, mixture, or preparation of the mature stalks (except the resin extracted therefrom), fiber, oil, or cake, or the sterilized seed of the plant which is incapable of germination. Cannabis does not mean "industrial hemp" as defined by Section 11018.5 of the Health and Safety Code.
Cannabis concentrate	Manufactured cannabis that has undergone a process to concentrate one or more of the active cannabinoids, thereby increasing the product's potency. Resin from granular trichomes from a cannabis plant is a concentrate for purposes of this document.
Cannabis strain	A hybrid or variety of cannabis with similar or identical combinations of properties such as appearance, taste, color, smell, cannabinoid profile, and potency.
Canopy	Means all of the following: (1) The designated area(s) at a licensed premises that will contain mature plants at any point in time; (2) Canopy shall be calculated in square feet and measured using clearly identifiable boundaries of all area(s) that will contain mature plants at any point in time, including all of the space(s) within the boundaries; (3) Canopy may be noncontiguous but each unique area included in the total canopy calculation shall be separated by an identifiable boundary such as an interior wall or by at least 10 feet of open space; and (4) If mature plants are being cultivated using a shelving system, the surface area of each level shall be included in the total canopy calculation.
Child resistant	Designed or constructed to be significantly difficult for children under five years of age to open, and not difficult for normal adults to use properly.

Commercial cannabis activity	Includes the cultivation, possession, manufacture, processing, storing, laboratory testing, labeling, transporting, distribution, delivery, or sale of commercial cannabis or a commercial cannabis product, except as set forth in Section 19319 of the Business and Professions Code, related to qualifying patients and primary caregivers.
Commingling	The physical aggregation of harvest batches or nonmanufactured cannabis products by a licensee.
Cultivation	Any activity involving the planting, growing, harvesting, drying, curing, grading, or trimming of cannabis.
Cultivation site	A location where commercial cannabis is planted, grown, harvested, dried, cured, graded, or trimmed, or that does all or any combination of those activities.
Cultivator	A person that conducts the planting, growing, harvesting, drying, curing, grading, or trimming of commercial cannabis.
Cultural resources	Remains and sites associated with past human activities and include prehistoric and ethnographic Native American archaeological sites, historic archaeological sites, historic buildings, elements or areas of the natural landscape that have traditional cultural significance, and paleontological (fossil) resources.
Customer	A natural person 21 years of age or over.
Day care center	As defined in Section 1596.76 of the Health and Safety Code.
Delivery	The commercial transfer of cannabis or cannabis products to a customer. Also includes the use by a retailer of any technology platform owned and controlled by the retailer, or independently licensed under this division that enables customers to arrange for or facilitate the commercial transfer by a licensed retailer of cannabis or cannabis products.
Department	California Department of Food and Agriculture.
Director	Director of the Department of Consumer Affairs.
Distribution	Procurement, sale, and transport of cannabis and cannabis products between entities licensed pursuant to Division 10 of the Business and Professions Code.
Distributor	A person licensed by the Bureau of Marijuana Control to engage in the business of purchasing commercial cannabis from a licensed cultivator or commercial cannabis products from a licensed manufacturer for sale to a licensed dispensary.

Dried flower	All dead cannabis that has been harvested, dried, cured, or otherwise processed, excluding leaves and stems.
Erosion	The detachment and movement of soil particles by natural forces primarily water (rain events) and wind.
Flowering	A cannabis plant that has formed a mass of pistils measuring greater than one-half inch wide at its widest point.
Fund	The Marijuana Control Fund established pursuant to Division 10, Section 26210 of the Business and Professions Code.
Growing cycle	Cultivation of cannabis plants from propagation to harvest of flowers.
Hazardous material	Any material that, because of quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment.
Immature plant	A cannabis plant that is not flowering.
Indoor cultivation	Cultivation of cannabis within a structure using artificial light, at a rate greater than 25 watts per square foot.
Integrated pest management	Coordinated use of information about pest population biology and the host environment combined with all available pest control methods to prevent unacceptable levels of pest damage by the most economical means and with the least possible hazard to people, property, and the environment.
Kind	Applicable type or designation regarding a particular cannabis variant or cannabis product type, including, but not limited to, strain name or other grower trademark, or growing area designation.
Labor peace agreement	An agreement between a licensee and a bona fide labor organization that, at a minimum, protects the State's proprietary interests by prohibiting labor organizations and members from engaging in picketing, work stoppages, boycotts, and any other economic interference with the applicant's business.
Lead agency	The public agency that has principal responsibility for carrying out or approving a project. The lead agency will decide whether an EIR or negative declaration will be required for the project and will cause the document to be prepared.

License	Under MCRSA: A state license issued by the California Department of Food and Agriculture granting authorization to cultivate commercial cannabis. Under AUMA: A state license issued under Division 10 of the Business and Professions Code.
Licensee	A person issued a state license by the Department to engage in commercial cannabis cultivation activity.
Licensing authority	**Under MCRSA:** The state agency responsible for the issuance, renewal, or reinstatement of a commercial cannabis license. **Under AUMA:** The state agency responsible for the issuance, renewal, or reinstatement of the license, or the state agency authorized to take disciplinary action against the licensee.
Live plants	Living commercial cannabis flowers and plants, including seeds, immature plants, and vegetative stage plants.
Local jurisdiction	A city, county, or city and county.
Local permit	(Also local license, or other authorization from a local jurisdiction) An official document issued by a local jurisdiction that specifically authorizes a person to conduct commercial cannabis cultivation in the local jurisdiction.
Lot	A batch, or a specifically identified portion of a batch.
Manufacture	To compound, blend, extract, infuse, or otherwise make or prepare a cannabis product.
Manufacturer	A person that conducts the production, preparation, propagation, or compounding of cannabis or cannabis products either directly or indirectly or by extraction methods, or independently by means of chemical synthesis, or by a combination of extraction and chemical synthesis at a fixed location that packages or repackages cannabis or cannabis products or labels or re-labels its container, that holds a state license pursuant to Division 10 of the Business and Professions Code.
Marijuana	**Under AUMA:** The same meaning as in Section 11018 of the Health and Safety Code, except that it does not include marijuana that is cultivated, processed, transported, distributed, or sold for commercial purposes under Chapter 3.5 of Division 8.

Marijuana accessories	**Under AUMA:** The same meaning as in Section 11018.2 of the Health and Safety Code.
Marijuana products	**Under AUMA:** The same meaning as in Section 11018.1 of the Health and Safety Code, except that it does not include marijuana products manufactured, processed, transported, distributed, or sold for commercial purposes under Chapter 3.5 of Division 8.
Mature plant	A cannabis plant that is flowering.
MCRSA	Medical Cannabis Regulation Safety Act (formerly known as the Medical Marijuana Regulation and Safety Act. Renamed in 2016). This Act, consisting of three separate bills (Assembly Bills 243 and 266, and Senate Bill 643), outlines a new structure for regulation and enforcement of medical cannabis production and use in California. The Act addresses issues such as cultivation, manufacture of cannabis products, quality control and inspection, distribution, dispensaries, and prescriptions for patients. The Act identifies a number of State agency responsibilities, including tasking the California Department of Food and Agriculture with licensing medical cannabis cultivation, as well as establishing a track-and-trace system, which involves development of a unique identifier for each plant, a reporting system, fees, and documents the transport path of plants from cultivation to distribution as a medicinal cannabis product.
Medical cannabis	(Also medical cannabis product) A product containing cannabis, including, but not limited to, concentrates and extractions, intended to be sold for use by medical cannabis patients in California pursuant to the Compassionate Use Act of 1996 (Proposition 215), found at Section 11362.5 of the Health and Safety Code. For the purposes of this document, medical cannabis does not include industrial hemp as defined in by Section 81000 of the Food and Agricultural Code or Section 11018.5 of the Health and Safety Code.
Medical information	Information identifying the names, addresses, or social security numbers of patients, their medical conditions, or the names of their primary caregivers, received and contained in the records of the Department of Public Health and by any county public health department are hereby deemed "medical information" within the meaning of the Confidentiality of Medical Information Act (Part 2.6 [commencing with Section 56], Division 1 of the Civil Code) and shall not be disclosed by the Department or by any county public health department except in accordance with the restrictions on disclosure of

	individually identifiable information under the Confidentiality of Medical Information Act.
Mixed-light cultivation	Cultivation of cannabis using light deprivation and/or artificial lighting below a rate of 25 watts per square foot.
Nonmanufactured cannabis product	Dried flower, shake, leaf, and pre-rolls intended to be sold for use by cannabis [customers].
Nursery	A licensee that produces only clones, immature plants, seeds, and other agricultural products used specifically for the planting, propagation, and cultivation of commercial cannabis.
Operation	Any act for which licensure is required under the provisions of Division 10 of the Business and Professions Code, or any commercial transfer of cannabis or cannabis products.
Outdoor cultivation	Cultivation of cannabis without the use of light deprivation and/or artificial lighting in the canopy area. Supplemental low intensity lighting is permissible only to maintain immature plants as a source for propagation.
Ownership interest	An interest held by a person who is an owner as defined in Section 8101 of CDFA's *Proposed Regulations for Medical Cannabis Cultivation Program* [included as Appendix A in the Draft PEIR].
Package or packaging	Any container or wrapper that may be used for enclosing or containing any nonmanufactured cannabis product for final retail sale. The term "package" does not include any shipping container or outer wrapping used solely for the transportation of nonmanufactured cannabis products in bulk quantity to any licensed manufacturer, processor, or distributor.
Person	An individual, firm, partnership, joint venture, association, corporation, limited liability company, estate, trust, business trust, receiver, syndicate, or any other group or combination acting as a unit and includes the plural as well as the singular number.
Pest	Any of the following things that is, or is liable to be, dangerous or detrimental to the agricultural industry of the state: (1) Any infectious, transmissible, or contagious disease of any plant, or any disorder of any plant which manifests symptoms or behavior which the director, after investigation and hearing, finds and determines is

	characteristic of an infectious, transmissible, or contagious disease;
	(2) Any form of animal life;
	(3) Any form of vegetable life.
Pesticide	Any of the following: (1) any spray adjuvant; (2) any substance, or mixture of substances which is intended to be used for defoliating plants, regulating plant growth, or for preventing, destroying, repelling, or mitigating any pest, as defined in Food and Agricultural Code section 12754.5, which may infest or be detrimental to vegetation, man, animals, or households, or be present in any agricultural or nonagricultural environment whatsoever.
Premises	The designated structure(s) and land specified in the application that are in possession of and used by the applicant or licensee to conduct the commercial cannabis activity. The premises shall be a contiguous area and may only be occupied by one licensee.
Pre-roll	Dried flower rolled in paper prior to retail sale.
Private residence	For the purposes of Section 11362.2 of the Health and Safety Code under AUMA, a house, an apartment unit, a mobile home, or other similar dwelling.
Processing	All activities associated with drying, curing, grading, trimming, storing, packaging, and labeling of non-manufactured cannabis products.
Propagate	To cultivate immature plants from cuttings or seeds.
Purchaser	The customer who is engaged in a transaction with a licensee for purposes of obtaining cannabis or cannabis products.
Responsible agency	Public agency which proposes to carry out or approve a project, for which a lead agency is preparing or has prepared an EIR or negative declaration. For the purposes of CEQA, the term responsible agency includes all public agencies other than the lead agency which have discretionary approval power over the project.
Secretary	Secretary of the California Department of Food and Agriculture.
Sale, sell	Includes any transaction whereby, for any consideration, title to cannabis is transferred from one person to another, and includes the delivery of cannabis or cannabis products

	pursuant to an order placed for the purchase of the same and soliciting or receiving an order for the same, but does not include the return of cannabis or cannabis products by a licensee to the licensee from whom such cannabis or cannabis product was purchased.
Smoke	To inhale, exhale, burn, or carry any lighted or heated device or pipe, or any other lighted or heated cannabis or cannabis product intended for inhalation, whether natural or synthetic, in any manner or in any form. "Smoke" includes the use of an electronic smoking device that creates an aerosol or vapor, in any manner or form, or the use of any oral smoking device for the purpose of circumventing the prohibition of smoking in a place.
Strain	A hybrid or variety of cannabis with similar or identical combinations of properties such as appearance, taste, color, smell, cannabinoid profile, and potency.
Substantially related	For the purposes of denial, suspension, or revocation of a license pursuant to Division 1.5 (commencing with Section 475) of the Business and Professions Code, a crime shall be considered to be substantially related to the qualifications, functions, or duties of a licensee or owner under Division 9 (commencing with Section 19300) of the Business and Professions Code, if it evidences present or potential unfitness of the licensee or owner of a cannabis cultivation license to perform the functions authorized by his or her license in a manner consistent with the public health, safety, or welfare. Such crimes or acts shall include, but not be limited to the following: (1) A felony conviction for the illegal possession for sale, sale, manufacture, transportation, or cultivation of a controlled substance. (2) A violent felony conviction, as specified in subdivision (c) of Section 667.5 of the Penal Code. (3) A serious felony conviction, as specified in subdivision (c) of Section 1192.7 of the Penal Code. (4) A felony conviction involving fraud, deceit, or embezzlement.
Testing service	A laboratory, facility, or entity in the state, that offers or performs tests of cannabis or cannabis products, including the equipment provided by such laboratory, facility, or entity, and that is both of the following:

	(1) Accredited by an accrediting body that is independent from all other persons involved in commercial cannabis activity in the state.
	(2) Registered with the California Department of Public Health.
Track-and-trace system	The State-approved system used to track commercial cannabis activity and movement.
Transport	The transfer of cannabis or cannabis products from the permitted business location of one licensee to the permitted business location of another licensee, for the purposes of conducting commercial cannabis activity authorized pursuant to the MCRSA.
Trustee agency	A State agency having jurisdiction by law over natural resources affected by a project which are held in trust for the people of the State of California.
Unique identifier (UID)	An alphanumeric code or designation used for reference to a specific plant on licensed premises.
Unreasonably impracticable	Means that the measures necessary to comply with the regulations require such a high investment of risk, money, time, or any other resource or asset, that the operation of a cannabis establishment is not worthy of being carried out in practice by a reasonably prudent business person.
Volatile solvent	Volatile organic compounds, including: (1) explosive gases, such as butane, propane, xylene, styrene, gasoline, kerosene, O_2 or H_2; and (2) dangerous poisons, toxins, or carcinogens, such as methanol, is-propyl alcohol, methylene chloride, acetone, benzene, toluene, and tri-chloro-ethylene.
Watts per square foot	The sum of the maximum wattage of all lights identified in the designated canopy area(s) in the Cultivation Plan divided by the sum of the dimensions in square feet of designated canopy area(s) identified in the Cultivation Plan.
Youth center	The same meaning as in Section 11353.1 of the Health and Safety Code.

Acronyms and Abbreviations

°F	degrees Fahrenheit
µg	micrograms
A	
AAA	American Automobile Association
AB	Assembly Bill
ACTM	Airborne Toxic Control Measure
AFV	alternative fuel vehicle
Ag Vision	California Agricultural Vision
amsl	above mean sea level
APA	Administrative Procedures Act
APCD	air pollution control district
AQMD	air quality management district
ATCM	Airborne Toxic Control Measure
AUMA	Adult Use Marijuana Act
B	
BAAQMD	Bay Area Air Quality Management District
Basin Plan	water quality control plan
BAU	business as usual
BEE	triclopyr butoxyethyl ester
BLM	U.S. Bureau of Land Management
BMC	Bureau of Marijuana Control
BMP	best management practice
B.P.	before present
Btk	bacillus thuringiensis kurstaki
C	
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CAC	county agricultural commissioner
CAFE	Corporate Average Fuel Economy
CalARP	California Accidental Release Prevention
CalEEMod	California Emissions Estimator Model
Cal/EPA	California Environmental Protection Agency
CAL FIRE	California Department of Forestry and Fire Protection
Cal NAGPRA	California Native American Graves Protection and Repatriation Act of 2001
Cal OES	California Office of Emergency Services
Cal/OSHA	California Department of Industrial Relations, Division of Occupational Safety and Health
CalRecycle	California Department of Resources Recycling and Recovery
Caltrans	California Department of Transportation
CAP	climate action plan
CAPCOA	California Air Pollution Control Officers
CARB	California Air Resources Board
CASGEM	California Statewide Groundwater Elevation Monitoring
CBD	cannabidiol
CCAA	California Clean Air Act

CCR	California Code of Regulations
CCRWQCB	Central Coast Regional Water Quality Control Board
CDFA	California Department of Food and Agriculture
CDFW	California Department of Fish and Wildlife
CDOC	California Department of Conservation
CDOF	California Department of Finance
CDPR	California Department of Pesticide Regulation
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERS	California Environmental Reporting System
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CH_4	methane
CHP	California Highway Patrol
CNEL	community noise equivalent level
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
COLD	Cold Fresh Water Habitat (beneficial use designation)
Court	U.S. Supreme Court
CRHR	California Register of Historical Resources
CRPR	California Rare Plant Bank
CRRWQCB	Colorado River Regional Water Quality Control Board
CTR	California Toxics Rule
CUPA	Certified Uniform Program Agency
CVRWQCB	Central Valley Regional Water Quality Control Board
CWA	Clean Water Act

D

dB	decibel
dBA	A-weighted decibels
DDT	dichlorodiphenyltrichloroethane
DDVP	dichlorvos (or 2,2-dichlorovinyl dimethyl phosphate)
DEA	U.S. Drug Enforcement Agency
Delta	Sacramento–San Joaquín Delta
DO	dissolved oxygen
DPM	diesel particulate matter
DTSC	California Department of Toxic Substances Control
DWR	California Department of Water Resources

E

EIR	environmental impact report
E.L.	combined noise emission level
EPCRA	Emergency Planning and Community Right-to-Know Act
ESA	Endangered Species Act

F

FAA	Federal Aviation Administration
FBI	Federal Bureau of Investigation
FE	federal endangered

FESA	Federal Endangered Species Act
FGDC	Federal Geographic Data Committee
FHWA	Federal Highway Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FMMP	California Farmland Mapping and Monitoring Program
FP	federal proposed
FR	Federal Register
FSZ	Farmland Security Zone
FT	federal threatened
FTA	Federal Transit Administration
G	
GHG	greenhouse gas
GSA	groundwater sustainability agency
GSP	groundwater sustainability plan
GWP	global warming potential
H	
H_2S	hydrogen sulfide
HAP	hazardous air pollutant
HCP	habitat conservation plan
HFC	hydrofluorocarbon
HMIS	Hazardous Materials Inventory Statement
HMMP	Hazardous Materials Management Plan
HPS	high-pressure sodium
HUD	U.S. Department of Housing and Urban Development
HVAC	heating, ventilating, and air conditioning
Hz	hertz
I	
ILRP	Irrigated Lands Regulatory Program
IPCC	Intergovernmental Panel on Climate Change
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
K	
kg	kilogram
kWh	kilowatt-hour
L	
LARWCQB	Los Angeles Regional Water Quality Control Board
LCFS	Low Carbon Fuel Standard
LDA	light-duty auto
L_{dn}	day-night average sound level
LDT	light-duty truck
LEandI	Law Enforcement and Investigation
LED	light-emitting diode
L_{eq}	equivalent sound level
$L_{eq}(h)$	equivalent sound level for a 1-hour period
LHDT	light-heavy-duty truck
L_{max}	maximum equivalent sound level
L_{min}	minimum equivalent sound level, or acoustic floor
LOS	level of service

L_X	sound level exceeded X percent of a given measurement period
L_v	human annoyance vibration level
M	
MAR	Marine Habitat (beneficial use designation)
MBTA	Migratory Bird Treaty Act
MCCP	Medical Cannabis Cultivation Program
MCRSA	Medical Cannabis Regulation and Safety Act
MEP	maximum extent practicable
mg/L	milligrams per liter
MLD	Most Likely Descendent
MMT CO_2e	million metric tons of carbon dioxide equivalent
MPO	metropolitan planning organization
MRZ	Mineral Resource Zone
MS	multiple sclerosis
MS4	municipal separate storm sewer system
MSDS	Material Safety Data Sheet
MTBE	methyl-tertiary butyl ether
N	
N_2O	nitrous oxide
NAA	nonattainment area
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NAHC	Native American Heritage Commission
NAS	National Academy of Sciences
NCCP	natural community conservation plan
NCRWQCB	North Coast Regional Water Quality Control Board
NEC	no exposure certification
NHPA	National Historic Preservation Act
NHTSA	National Highway Traffic Safety Administration
NIDA	National Institute on Drug Abuse
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
NOA	notice of availability
NOA	naturally occurring asbestos
NOAEL	no observable adverse effect level
NOC	notice of completion
NOI	notice of intent
NONA	notice of non-applicability
NOP	notice of preparation
NO_X	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPK	nitrogen, phosphorus, and potassium
NPS	National Park Service
NRHP	National Register of Historic Places
NTR	National Toxics Rule
NWSRS	National Wild and Scenic Rivers System

O	
O_3	ozone
OBD	on-board diagnostic systems
OEHHA	California Office of Environmental Health Hazard Assessment
OSHA	Occupational Safety and Health Administration
P	
PAP	pesticide application plan
PCA	agricultural pest control adviser
PCBs	polychlorinated biphenyl compounds
PEIR	program environmental impact report
PERP	Portable Equipment Registration Program
PFC	perfluorocarbon
PG&E	Pacific Gas and Electric Company
PM	particulate matter
$PM_{2.5}$	particulate matter with aerodynamic radius of 2.5 micrometers or less
PM_{10}	particulate matter with aerodynamic radius of 10 micrometers or less
ppb	parts per billion
ppm	parts per million
PPV	peak particle velocity
PRC	California Public Resources Code
Proposed Program	CalCannabis Cultivation Licensing program
PSIS	Pesticide Safety Information Series
PVC	polyvinyl chloride
Q	
QAC	qualified applicator certificate
QAL	qualified applicator license
R	
RCRA	Resource Conservation and Recovery Act
RMP	risk management plan
ROG	reactive organic gas
RWQCB	regional water quality control board
S	
SAL	Inland Saline Water Habitat (beneficial use designation)
SAR	Second Assessment Report
SARA	Superfund Amendments and Reauthorization Act
SARWQCB	Santa Ana Regional Water Quality Control Board
SB	Senate Bill
SC	state candidate
SCS	Sustainable Communities Strategies
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
SDG&E	San Diego Gas & Electric
SDRWQCB	San Diego Regional Water Quality Control Board
SDWA	Safe Drinking Water Act
SE	state endangered
SF_6	sulfur hexafluoride

SFBRWQCB	San Francisco Bay Regional Water Quality Control Board
SFP	state fully protected
SFRWQCB	San Francisco Regional Water Quality Control Board
SGMA	Sustainable Groundwater Management Act
SIP	state implementation plan
SJVAPCD	San Joaquin Valley Air Pollution Control District
SMAQMD	Sacramento Metropolitan Air Quality Management District
SO_2	sulfur dioxide
SPoT	stream pollution trends
SPWN	Spawning, Reproduction, and/or Early Development (beneficial use designation)
SRA	state responsibility area
SRIA	Standardized Regulatory Impact Assessment
SSC	state species of special concern
ST	state threatened
SWAMP	Surface Water Ambient Monitoring Program
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
T	
TAC	toxic air contaminant
TCP	Traditional Cultural Properties
TCR	tribal cultural resource
TEA	triclopyr triethylamine salt
THC	tetrahydrocannabinol
THPO	tribal historic preservation officer
TMDL	total maximum daily load
TPZ	timber production zone
TRI	Toxic Release Inventory
TRU	transport refrigeration unit
TRV	toxicity reference value
U	
UC IPM	University of California, Integrated Pest Management
UID	Unique Identifier
USC	U.S. Code
USEPA	U.S. Environmental Protection Agency
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
V	
VdB	vibration decibels
VOC	volatile organic compound
W	
WARM	Warm Fresh Water Habitat (beneficial use designation)
WDR	waste discharge requirement
Williamson Act	California Land Conservation Act of 1965
Y	
YSAQMD	Yolo-Solano Air Quality Management District

Chapter 9
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Chapter 10
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Chapter 1 Introduction

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Chapter 4 Environmental Analysis

4.0 Introduction to the Environmental Analysis

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Chapter 7 Growth Inducement

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Chapter 8 Glossary and Acronyms

No references cited.

Chapter 9 Report Preparation

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