

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER R5-2015-0113

WASTE DISCHARGE REQUIREMENTS GENERAL ORDER
FOR DISCHARGES OF WASTE
ASSOCIATED WITH MEDICINAL CANNABIS CULTIVATION ACTIVITIES

This General Order regulates the discharge of wastes from cannabis cultivation sites to waters of the state. This General Order does not authorize, endorse, sanction, permit, or approve the cultivation, use, or sale of cannabis.

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The Central Valley Regional Water Quality Control Board (Central Valley Water Board or Board) finds, with respect to the discharge of wastes from cannabis cultivation sites, that:

OVERVIEW

1. Cannabis cultivation in the Central Valley Region has grown exponentially in recent years. Largely unregulated, cannabis cultivation and related activities are resulting in significant water quality impacts.
2. Though cannabis cultivation for recreational purposes is illegal under California Law (Health & Saf. Code § 11358.), the Compassionate Use Act of 1996 (Prop 215) created an exception to criminal prosecution for those who grow cannabis for seriously ill Californians that have received a recommendation from a physician that cannabis may provide relief for their illnesses.
3. The Central Valley Water Board is issuing this General Order to reduce water quality impacts associated with the cultivation of cannabis while the Board either develops a more comprehensive regulatory program specific to cannabis cultivation or fully integrates cannabis cultivators into an existing regulatory program or programs.
4. Cultivation activities that occupy and/or disturb less than 1000 square feet, have not been demonstrated to cause more than *de minimis impacts* to water quality. Such cultivation activities do not pose a significant threat to water quality and are not covered under this General Order.
5. Under this General Order, “Dischargers” are defined as any person engaged in cultivating cannabis that discharges or threatens to discharge waste where it could affect the quality of waters of the state. This term includes landowners, growers, lessees, and tenants of private land where cannabis is grown and of lands that are modified or maintained to facilitate cannabis cultivation. This term does not include those individuals whose cultivation activities occupy and/or disturb less than 1000 square feet.
6. This General Order regulates discharges to waters of the state, which includes both surface waters and ground waters.

REGULATORY CONSIDERATIONS

7. Water Code section 13260(a) requires that any person currently discharging or proposing to discharge waste that could affect the quality of the waters of the State file a Report of Waste Discharge (RWD) with the appropriate Regional Water Quality Control Board.
8. Pursuant to Water Code section 13263, the Central Valley Water Board has the obligation to prescribe waste discharge requirements (WDRs) for waste discharges that could affect the quality of waters of the Central Valley Region.
9. The *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins* and the *Water Quality Control Plan for the Tulare Lake Basins* (hereafter Basin Plans) collectively cover the entire Central Valley Region. The Basin Plans designate beneficial uses, establish water quality objectives, contain implementation plans and policies for protecting waters of the basin, and incorporate by reference plans and policies adopted by the State Water Board.
10. The beneficial uses of surface waters that may receive discharges as runoff from cannabis cultivation sites, as stated in the Basin Plans, include: municipal and domestic supply; agricultural

supply; groundwater recharge; fresh water replenishment; navigation; hydropower generation; water contact recreation; non-contact water recreation; commercial and sport fishing; aquaculture; warm freshwater habitat; cold freshwater habitat; wildlife habitat; migration of aquatic organisms; spawning, reproduction, and/or early development.

11. The beneficial uses of underlying groundwater as set forth in the Basin Plans are municipal and domestic supply, agricultural supply, industrial service supply and industrial process supply.
12. The Basin Plan establishes narrative water quality objectives for chemical constituents, tastes and odors, and toxicity in groundwater. It also sets forth a numeric objective for total coliform organisms.
13. The Basin Plan's numeric water quality objective for bacteria requires that the most probable number (MPN) of coliform organisms over any seven-day period shall be less than 2.2 per 100 mL in MUN groundwater.
14. The Basin Plan's narrative water quality objectives for chemical constituents, at a minimum, require waters designated as domestic or municipal supply to meet the maximum contaminant levels (MCLs) specified in Title 22 of the California Code of Regulations (hereafter Title 22). The Basin Plan recognizes that the Central Valley Water Board may apply limits more stringent than MCLs to ensure that waters do not contain chemical constituents in concentrations that adversely affect beneficial uses.
15. The narrative toxicity objective requires that groundwater be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, animal, plant, or aquatic life associated with designated beneficial uses.
16. Quantifying a narrative water quality objective requires a site-specific evaluation of those constituents that have the potential to impact water quality and beneficial uses. The Basin Plan states that when compliance with a narrative objective is required to protect specific beneficial uses, the Central Valley Water Board will, on a case-by-case basis, adopt numerical limitations in order to implement the narrative objective.
17. Discharges of wastes from cannabis cultivation activities that threaten to impact the beneficial uses of waters of the state include:
 - i. Discharges of sediment from graded roads, grow sites, and spoil sites to surface waters;
 - ii. Discharges of soil, fertilizers, pesticides, herbicides, and rodenticides, which threaten to impact surface waters and ground waters and which impact wildlife;
 - iii. Discharges from improperly constructed and unmaintained stream crossings and culverts;
 - iv. Development within and adjacent to wetlands and riparian zones;
 - v. Discharges of trash associated with cannabis cultivation;
 - vi. Discharges of human waste and household refuse; and
 - vii. Spills and leaks of petroleum products and other chemicals associated with pumps and cultivation equipment.
18. The Board's Irrigated Lands Regulatory Program, Construction and Industrial Stormwater Programs, and Forest Activities Program all regulate discharges similar to those seen at many cannabis cultivation sites. Where applicable, this General Order requires cannabis cultivators to

apply for coverage under the State Water Board's Construction and Industrial Stormwater Program or abide by conditions set by the Central Valley Water Board's Forest Activities Program. While this General Order is in effect, the Central Valley Water Board will be working to either effectively incorporate the conditions necessary to protect waters of the State into existing regulatory programs, or will be developing a cannabis-specific regulatory program.

19. The Board's Irrigated Lands Regulatory Program (ILRP) has partnered with numerous Third-Party "Coalitions" that effectively operate as discharger-funded intermediaries between the Board and the tens of thousands of traditional agricultural growers in the region. These coalitions are geographic or commodity-based groups that maintain member rolls, collect regulatory fees from enrollees, conduct water quality monitoring, submit reports to the Central Valley Water Board, conduct educational and outreach programs to inform enrollees of compliance requirements, and develop management plans to address water quality problems. Should a collective of cannabis growers form a coalition that demonstrates the capacity to fulfill these functions, the Board may authorize such a coalition to perform a similar function for this program.

MONITORING AND REPORTING

20. Water Code section 13267 states, in relevant part:

(b)(1) In conducting an investigation . . . , the regional board may require that any person who has discharged, discharges, or is suspected of having discharged or, discharging, or who proposes to discharge waste within its region . . . shall furnish, under penalty of perjury, technical or monitoring program reports which the regional board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports. In requiring those reports, the regional board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports.

Large-scale and high-risk cannabis cultivators will be required to submit annual reports to the Board under this General Order. Large-scale and high-risk Dischargers are responsible for submitting monitoring reports because discharges from these cultivation sites pose a significant risk to water quality. As the reporting requirements are relatively simple to complete, the burden of preparing and submitting such reports to the Board is reasonable.

ANTI-DEGRADATION

21. State Water Board Resolution 68-16, the Statement of Policy with Respect to Maintaining High Quality of Waters in California (*Anti-Degradation Policy*) generally prohibits the Central Valley Water Board from authorizing activities that will result in the degradation of high-quality waters unless it has been shown that:
 - i. The degradation will not result in water quality less than that prescribed in state and regional policies, including violation of one or more water quality objectives;
 - ii. The degradation will not unreasonably affect present and anticipated future beneficial uses;
 - iii. The discharger will employ Best Practicable Treatment or Control (BPTC) to minimize degradation; and
 - iv. The degradation is consistent with the maximum benefit to the people of the State.

The Board has evidence that cannabis cultivation activities are resulting in the degradation of high-quality waters in many areas throughout the Central Valley Region. This General Order is the

first step in a strategic initiative to comprehensively ensure that degradation due to cannabis cultivation does not result in water quality less than that prescribed in state and regional policies and will not unreasonably affect present and anticipated future beneficial uses. What is considered BPTC for the control of pollutants that may cause degradation from cannabis cultivation sites has not yet been defined; the information gathered by the Board while this General Order is in effect is intended to help define what measures should be considered BPTC at different cannabis cultivation sites. The people of the State, in approving Proposition 215, have determined that seriously ill patients may legally consume cannabis, and this General Order is designed to ensure that the cultivation activities necessary to provide such therapeutic cannabis do not cause undue water quality degradation.

CALIFORNIA ENVIRONMENTAL QUALITY ACT

22. This General Order both imposes regulatory requirements on existing cannabis cultivation sites and will regulate the water quality impacts related to the development of future cannabis cultivation sites. The issuance of regulatory restrictions on already-developed cannabis cultivation sites in order to ensure the protection of both surface and groundwater resources is exempt from the provisions of the California Environmental Quality Act ("CEQA") (Pub. Resources Code, § 21000 et seq.) in accordance with California Code of Regulations, title 14, section 15301, which exempts the "operation, repair, maintenance, [and] permitting ... of existing public or private structures, facilities, mechanical equipment, or topographical features" from environmental review.
23. Dischargers that own sites that have not yet been developed for cannabis cultivation can only receive regulatory coverage under this General Order upon demonstrating compliance with CEQA by completing the Notice of Intent (NOI) included with this Order as Attachment B. Completing the NOI includes making a demonstration that:
 - i. Any potential impacts to wetlands and vernal pools have been permitted pursuant to section 401/404 of the federal Clean Water Act;
 - ii. A Section 1602 Streambed Alteration has been procured, if necessary;
 - iii. The Discharger has obtained coverage under the State Water Board's Construction General Stormwater Permit, if necessary;
 - iv. The Discharger has obtained a Timberland Conversion Permit, if necessary;
 - v. The development of the Cannabis Cultivation Site is in compliance with any applicable County regulations and ordinances, including grading, construction, and building ordinances;
 - vi. That any and all impacts to special-status species have been fully mitigated; and
 - vii. That all potential impacts to cultural resources will be appropriately addressed and mitigated.
24. Issuance of this General Order is also exempt from CEQA in accordance with California Code of Regulations, title 14, section 15307, which exempts from environmental review actions by regulatory agencies for the protection of natural resources. This action may also be considered exempt from environmental review pursuant to California Code of Regulations, title 14, section 15308, which exempts actions by regulatory agencies for the protection of the environment.

OTHER REGULATORY CONCERNS

25. There are no pesticides approved by regulatory agencies for use on cannabis. Attachment D lists active ingredients that are exempt from residue tolerance requirements, and either exempt from registration requirements or registered for a use that's broad enough to include use on cannabis, and therefore can be used legally to control pests of cannabis plants in California. The use of any pesticides shall be consistent with product labeling and any such products shall be placed, used, and stored in a manner that ensures that they will not enter or be released to surface or ground waters.
26. The Executive Officer or Central Valley Water Board may terminate permit coverage under the General Order for any individual discharger at any time when such termination is in the public interest.
27. Water Code section 13260(d)(1)(A) requires persons subject to waste discharge requirements to pay an annual fee established by the State Water Board. On 16 September 2015, the State Water Board established a fee schedule for the discharges covered by this Order. Dischargers seeking coverage under this Order in Tiers 1, 2, or 3 are required to pay an annual fee as set forth in California Code of Regulations, title 23, section 2200.7.
28. This General Order does not preclude the need for permits that may be required by other governmental agencies, nor does it supersede any requirements, ordinances, or regulations of any other regulatory agency, including necessary certification and permitting for the application of pesticides and herbicides and proper handling and disposal of human/domestic wastes.
29. Pursuant to Water Code section 13263(g), discharge is a privilege, not a right, and adoption of this Order does not create a vested right to continue the discharge.
30. In compliance with Water Code section 106.3, it is the policy of the State of California that every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes. This order promotes that policy by requiring discharges to comply with water quality objectives developed to protect municipal and domestic water supplies.

PUBLIC NOTICE

31. All the above was considered in establishing the following conditions of discharge.
32. The Central Valley Water Board has notified interested agencies and persons of its intent to prescribe waste discharge requirements for medicinal cannabis cultivation, and they have been provided an opportunity to participate in three public workshops and to submit written comments, and an opportunity for a public hearing.
33. All comments pertaining to the discharge were heard and considered in a public hearing.

IT IS HEREBY ORDERED that, pursuant to Water Code sections 13263 and 13267, all Cannabis Cultivators meeting criteria for coverage under these WDRs, including their agents, successors, and assigns, in order to meet the provisions contained in Division 7 of the Water Code and regulations adopted hereunder, shall comply with the following.

Prohibitions, Site Access, and Specifications Applicable to All Cannabis Cultivators

The following parts of this General Order are applicable to anyone cultivating cannabis in the Central Valley Region.

Discharge Prohibitions: All Cannabis Cultivators

1. The discharge shall neither create nor threaten to create a condition of pollution or nuisance, as defined by Water Code section 13050.
2. The discharge of earthen materials, soil, silt, plant waste, slash, or other organic, or inorganic refuse, rubbish, and solid waste, chemicals, 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 potentially causing toxicity, into any stream or watercourse is prohibited.
3. The Discharge of hazardous wastes, as that term is defined in California Code of Regulations, title 22, section 66261.1 *et seq.*, is prohibited.
4. The discharge of any waste not specifically regulated by this General Order and that could affect the quality of the waters of the state is prohibited, unless the discharger obtains regulatory coverage under separate WDRs or certification issued by the Central Valley Water Board or the State Water Resources Control Board.

Site Access: All Cannabis Cultivators

5. The Discharger shall allow Water Board staff and/or California Department of Fish and Wildlife staff reasonable access onto the affected property for the purpose of performing inspections to determine compliance with this Order.

Discharge Specifications: All Cannabis Cultivators

6. Cultivation areas must be maintained so as to prevent nutrients from leaving the Site during the growing season and post-harvest.
7. Adequate buffers shall be in place to filter wastes from surface water discharges from production lands and associated facilities to all lakes, wetlands¹, watercourses², drainage ditches, or other water conveyances.

¹ A wetland is an area that is covered by shallow water or where the surface soil is saturated, either year round or during periods of the year; where that water coverage has caused a lack of oxygen in the surface soil; and has either no vegetation or plants of a type that have adapted to shallow water or saturated soil. Some examples are fresh water marshes, bogs, springs, riparian areas, vernal pools, coastal mud flats and salt marshes.

² Watercourse means any well-defined channel with distinguishable bed and bank showing evidence of having contained flowing water indicated by deposit of rock, gravel, sand, or soil.

8. Access roads shall be constructed and maintained so as to prevent road surface and fill material from discharging to any surface water body (i.e. lake, wetland, Class I, II, or III³ watercourse).
9. No production lands or associated facilities⁴ are allowed to be located within 100 feet of any surface water body.
10. In areas outside timberland, pursuant to Public Resource Code section 4526, no tree removal for the purposes of facilitating production, including solar exposure increases, within 150 feet of fish bearing water bodies or 100 feet of aquatic habitat for non-fish aquatic species (i.e. aquatic insects). In areas inside timberland, any tree removal is subject to the conditions and requirements set forth in the Zberg-Nejedly Forest Practice Act and the California Forest Practice Rules.
11. Tailwater return flows shall be managed so that any entrained constituents, such as fertilizers, pesticides, fine sediment and suspended organic particles, and other oxygen consuming materials and wastes are not discharged to nearby watercourses. This could include modifications to irrigation systems that reuse tailwater by constructing off-stream retention basins, active (pumping) and or passive (gravity) tailwater recapture/redistribution systems.
12. Fertilizers, potting soils, compost, and other soils and soil amendments must be stored in locations where they cannot enter or be transported into surface waters and where nutrients or other elements cannot be leached into groundwater.
13. Pesticides, petroleum products, and other liquid chemicals (including diesel, gasoline, oils, etc.) must be stored so as to prevent their spillage, discharge, or seepage. Storage tanks and containers must be of suitable material and construction to be compatible with the substance(s) stored and conditions of storage such as pressure and temperature. Above ground storage tanks and containers must be provided with a secondary means of containment for 110 percent of the capacity of the largest single container and sufficient freeboard to contain precipitation.
14. Disposal of human waste must meet applicable County health standards, local agency management plans and ordinances, and/or the State Water Board's Onsite Wastewater Treatment System (OWTS) policy, and does not represent a threat to surface water or ground water.
15. Dischargers shall obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit, 2009-0009-DWQ) for construction projects that disturb one or more acres of soil or for projects that disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres of soil, specifically for new site preparation and development. Dischargers shall submit to Regional Water Board staff a copy of the Stormwater Pollution Prevention Plan (SWPPP) developed for the site in compliance with the Construction General Permit.

³ The California Forest Practice Rules define a Class I watercourse as 1) a watercourse providing habitat for fish always or seasonally, and/or 2) providing a domestic water source; a Class II watercourse is 1) a watercourse capable of supporting non-fish aquatic species, or 2) a watercourse within 1000 feet of a watercourse that seasonally or always has fish present; a Class III watercourse is a watercourse with no aquatic life present and that shows evidence of being capable of transporting sediment to Class I and Class II waters during high water flow conditions.

⁴ Associated facilities include those constructed or placed features that facilitate plant cultivation (including but not limited to amendments storage and mixing buildings/areas, material storage buildings/areas, greenhouses, and generators).

16. Dischargers shall notify the California Department of Fish and Wildlife (CDFW) and the State Water Board's Division of Water Rights prior to beginning any activity that may substantially divert or obstruct the natural flow of any river, stream, or lake; substantially change or use any material from the bed, channel, or bank of any river, stream, or lake; or deposit or dispose of debris, waste or other material where it may pass into any river, stream, or lake. (Fish & Game Code § 1602.) To notify CDFW, dischargers shall complete the Lake or Streambed Alteration Notification forms (Notification) and shall submit the Notification with the appropriate fee to the CDFW Regional Office that serves the county where the activity will take place. Dischargers shall obtain a Lake or Streambed Alteration Agreement when CDFW determines that the activity may substantially adversely affect existing fish or wildlife resources.
17. Diversion and/or storage of water from a river, stream, or lake shall be conducted pursuant to a valid water right and in compliance with all applicable reporting and measurement requirements including those under Water Code sections 5101-5107. A Cultivator diverting or storing of water from a river, stream, or lake in connection with their cultivation activities must attach one of the following to the NOI that they will submit to the Central Valley Water Board:
- A letter, email, or receipt from the State Water Board acknowledging that the Cultivator has filed a statement with the State Water Board in support of a pre-1914 or riparian claim,
 - An appropriate water permit, or license; or
 - A true and correct copy of an application, **or other documentation verifying** that the Cultivator has submitted **an application** to the State Water Board to obtain such a right, permit, registration, or license; or
 - A statement explaining why such documentation cannot be provided.
- Copies of such documents may be downloaded from the State Water Board's Electronic Water Rights Information Management System (eWRIMS).
18. Discharger shall follow all applicable Best Management Practices (BMPs) listed in the Central Valley Water Board's Cannabis Cultivation BMP's Manual (Attachment A).
19. Dischargers⁵ must characterize their operations according to the following characteristics, and follow the applicable conditions specific to their regulatory tier:
- Tier 1: Cultivation activities are located on slopes less than 30%, occupy and/or disturb less than 1/4 acre, and are not located within 200 feet of a wetland, Class I or II watercourse.
- Tier 2: Cultivation activities are located on less than 30% slopes, occupy and/or disturb less than 1 acre and less than 50% of the Cultivator's/Landowner's parcel, and are not within 200 feet of a wetland, Class I or II watercourse.
- Tier 3: Cultivation activities are located on greater than 30% slopes, occupy and/or disturb more than 1 acre or more than 50% of the Cultivator's/Landowner's parcel, or are within 200 feet of a wetland, Class I or II watercourse.
20. For those discharges requiring submittal of a RWD, the discharger must submit the fee specified in California Code of Regulations, title 23, section 2200.

⁵ Dischargers that cultivate cannabis on more than one site within a parcel or contiguous parcels, must combine the area that all the sites occupy and/or disturb and must characterize their operations for Tier determination based on the site with the greatest threat to water quality (i.e. the site with the steepest slopes and/or closest proximity to a surface water body). Dischargers that cultivate cannabis on multiple discontinuous parcels must obtain regulatory coverage for each parcel.

Discharge Specification Applicable to Tier 1 Cannabis Cultivators

Definition: A Tier 1 Cultivator poses a low threat to water quality based on certain physical characteristics of their operation such as slope, proximity to surface water, and small scale of operation. Specifically, slopes are no more than 30% (as measured between cultivation areas or associated facilities and nearest surface water body), cultivation activities occupy and/or disturb less than 1/4 acre (10,890 square feet) of the Cultivator's/Landowner's parcel, and no cultivation areas or associated facilities are located within 200 feet of a wetland, Class I or II watercourse.

Permit Application: Tier 1 Cultivators must submit a Notice of Intent (NOI) to obtain regulatory coverage to the Central Valley Water Board and pay an annual fee for coverage under this Order to the Central Valley Water Board.

21. Tier 1 Cultivators must maintain a copy of the Central Valley Water Board's Cannabis Cultivation BMPs Manual, included as Attachment A, a part of this Order, on all premises where cannabis is being cultivated. Failure to have a copy on hand is grounds for the Central Valley Water Board or the State Water Board to find a violation of this Order.

Discharge Specifications Applicable to Tier 2 Cannabis Cultivators

Definition: A Tier 2 Cultivator poses a moderate threat to water quality based on certain physical characteristics of their operation such as slope, proximity to surface water, and scale of operation. Specifically, slopes are no more than 30% (as measured between cultivation areas or associated facilities and nearest surface water body), cultivation activities and associated facilities occupy and/or disturb less than 1 acre and no more than 50% of the Cultivator's/Landowner's parcel(s), and no cultivation activities or associated facilities are located within 200 feet of a wetland, Class I or II watercourse.

Permit Application and Reporting: Tier 2 Cultivators must submit a Notice of Intent (NOI) to obtain regulatory coverage to the Central Valley Water Board, pay annual fees for coverage under this Order to the Central Valley Water Board, and submit annual monitoring reports.

22. Tier 2 Cultivators must maintain a copy of the Central Valley Water Board's Cannabis Cultivation BMPs Manual, included as Attachment A, a part of this Order, on all premises where cannabis is being cultivated. Failure to have a copy on hand is grounds for the Central Valley Water Board or the State Water Board to find a violation of this Order.
23. Tier 2 Cultivators shall conduct a pre-winter Implementation Inspection by **November 1** of each year to assure that BMPs are in place and secure prior to the winter period. Tier 2 Cultivators shall conduct an Effectiveness Monitoring Inspection **after April 1 and before June 15** to assess the effectiveness of BMPs and to identify any additional BMPs necessary. Tier 2 Cultivators must prepare and submit an Annual Monitoring Report to the Executive Officer by **July 15** of each year. The Annual Monitoring Report shall, at a minimum, include the date and type of each inspection, the inspector's name, the inspector's findings, and shall describe how the Discharger has complied with the requirements of the General Order for Cannabis Cultivation.

Discharge Specifications Applicable to Tier 3 Cannabis Cultivators

Definition: A Tier 3 Cultivator poses an elevated threat to water quality based on certain physical characteristics of their operation such as; slope, proximity to surface water, and/or scale of operation. Specifically, slopes are more than 30% (as measured between cultivation areas or associated facilities and nearest surface water body), or cultivation activities and associated facilities occupy and/or disturb more than 1 acre or more than 50% of the Cultivator's/Landowner's parcel(s), or cultivation activities or associated facilities are located within 200 feet of a wetland, Class I or II watercourse.

Permit Application and Reporting: Tier 3 Cultivators must submit a Notice of Intent (NOI) to obtain regulatory coverage to the Central Valley Water Board, pay annual fees for coverage under this Order to the Central Valley Water Board, and submit Annual Monitoring Reports. Tier 3 Cultivators must also develop a Site Management Plan describing practices that will be implemented on the Site to minimize impacts to surface and ground waters.

24. Tier 3 Cultivators must maintain a copy of the Central Valley Water Board's Cannabis Cultivation BMPs Manual, included as Attachment A, a part of this Order, on all premises where cannabis is being cultivated. Failure to have a copy on hand is grounds for the Central Valley Water Board or the State Water Board to find a violation of this Order.
25. Tier 3 Cultivators must prepare and submit for approval to the Central Valley Water Board a Site Management Plan. The level of detail required in a Site Management Plan will be dependent on the site-specific characteristics of the activity/operation. Plans must be kept available on the site and subject to inspection. Site Management Plans must address the following:
 - i. Map of property including areas of operations, roads, water bodies, all cleared/developed areas, and including general drainage patterns and directions.
 - ii. Applicable design drawings and schematics for watercourse structures, fish passages, roads, septic tanks, fill prisms, ponds, or any constructed feature that has been designed or engineered.
 - iii. Detailed list with locations of specific management practices to address erosion control/stability, stream crossing construction/maintenance, riparian protection, road construction/maintenance, spoils storage and disposal, irrigation runoff, water diversion practices, and water storage and use.
 - iv. List of chemicals stored onsite (fertilizers, pesticides, herbicides, petroleum products, etc...) and information about their frequencies and quantities of use.
26. Tier 3 Cultivators shall conduct a pre-winter Implementation Inspection by **November 1** of each year to assure that BMPs are in place and secure prior to the winter period. Tier 3 Cultivators shall conduct an Effectiveness Monitoring Inspection **after April 1 and before June 15** to assess the effectiveness of BMPs and to identify any additional BMPs necessary. Tier 3 Cultivators must prepare and submit an Annual Monitoring Report to the Executive Officer by **July 15** of each year. The Annual Monitoring Report shall, at a minimum, include the date and type of each inspection, the inspector's name, the inspector's findings, and shall describe how the Discharger has complied with the requirements of the General Order for Cannabis Cultivation.

If, in the opinion of the Executive Officer, the Discharger fails to comply with the provisions of this Order, the Executive Officer may refer this matter to the Attorney General for judicial enforcement, may issue a complaint for administrative civil liability, or may take other enforcement actions. Failure to comply with this Order or with individual WDRs may result in the assessment of Administrative Civil Liability of up to \$10,000 per violation, per day, depending on the violation, pursuant to the Water Code,

including sections 13268, 13350 and 13385. The Central Valley Water Board reserves its right to take any enforcement actions authorized by law.

Any person aggrieved by this action of the Central Valley Water Board may petition the State Water Board to review the action in accordance with Water Code section 13320 and California Code of Regulations, title 23, sections 2050 and following. The State Water Board must receive the petition by 5:00 p.m., 30 days after the date of this Order, except that if the thirtieth day following the date of this Order falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at:

http://www.waterboards.ca.gov/public_notices/petitions/water_quality

or will be provided upon request.

I, PAMELA C. CREEDON, Executive Officer, do hereby certify that the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board on 2 October 2015.

original signed by

PAMELA C. CREEDON, Executive Officer

Attachment A

Best Management Practices Manual for Cannabis Cultivation

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

BEST MANAGEMENT PRACTICES MANUAL
FOR CANNABIS CULTIVATION

LEGAL DISCLAIMER

The Central Valley Regional Water Quality Control Board (Central Valley Water Board) does not authorize, endorse, sanction, permit, or approve the cultivation, use, or sale of cannabis. The Central Valley Water Board has a non-delegable duty to enforce water quality laws, including waste discharges resulting from cannabis cultivation sites, as evidence demonstrates that these discharges can and do affect the quality of waters of the state. The Central Valley Water Board has the authority to enforce water quality laws despite the discontinuity between California law, which legalizes the medical use of cannabis (Compassionate Use Act – Prop 215), and the federal Controlled Substances Act, which prohibits the possession of cannabis.

AGENCIES WITH AN INTEREST IN ACTIVITIES ASSOCIATED WITH CANNABIS CULTIVATION

FEDERAL

U.S. Army Corps of Engineers

Sacramento District HQ Office
1325 J Street – Room 1350
Sacramento, CA 95814
Phone: (916) 557-5250
Fax: (916) 557-5306
cespk-regulatory-info@usace.army.mil

The US Army Corps of Engineers (Corps of Engineers) is responsible for many beneficial uses of water, including transportation, navigation, recreation, and power production. The Corps of Engineers may require review under Section 10 of the Rivers and Harbors Act of 1899 for activities within navigable waters and/or a Section 404 permit under the Federal Clean Water Act of 1977 for activities within wetlands/vernal pools. If you are planning to work in navigable waters of the U.S., or discharge (dump, place, deposit) dredged or fill material in waters of the U.S., including watercourses, wetlands, and vernal pools, you must first obtain a permit from the Corps of Engineers.

National Marine Fisheries Service

Southwest Regional Office
501 West Ocean Blvd.
Long Beach, CA 90802
Phone: (562) 980-4001
<http://swr.nmfs.noaa.gov>

U.S. Fish and Wildlife Service

Sacramento Fish & Wildlife Office
2800 Cottage Way – Room W-2605
Sacramento, CA 95825
Phone: (916) 414-6600
Fax: (916) 414-6712/6713
<http://www.fws.gov/sacramento/>

The National Marine Fisheries Service (NMFS) has regulatory authority over anadromous fish (i.e., salmon and steelhead) and their habitat. The US Fish and Wildlife Service (USFWS) regulates issues involving resident fish and other animals and plants. Together these agencies administer the Endangered Species Act (ESA). This law prohibits the “take” of listed species through direct harm or habitat destruction.

If you plan to harvest timber, manage, or otherwise develop your property and you think there might be an endangered species on your land, you should first contact the California Department of Fish and Wildlife (CDFW) or the USFWS. Activities to develop a site for cannabis cultivation may need to be restricted or limited in areas containing listed plants and animals or their critical habitat in order to fully protect those species. CDFW, NMFS, and USFWS personnel can provide technical assistance to help you design your project to avoid taking an endangered species.

STATE of CALIFORNIA

State Water Resources Control Board – Division of Water Rights

1001 I Street

Sacramento, CA 95814

Phone: (916) 341-5300

<http://www.waterboards.ca.gov/waterrights>

The State Water Resources Control Board (State Water Board) allocates water rights, adjudicates water right disputes, develops statewide water protection plans, establishes water quality standards, and guides the nine Regional Water Quality Control Boards located in the major watersheds of the state. The Regional Boards, each comprised of seven members, serve as the frontline for state and federal water pollution control efforts.

The State Water Board’s - Division of Water Rights is responsible for administering water rights in California. If you plan to divert or take water from any surface water body (i.e. lake, river, stream, or creek), the California Water Code requires that you have a basis of water right on file with the Division of Water Rights. Water rights are specific to a piece of property, and adjudicated water rights are generally cited in a deed and annual reporting requirements generally apply. Riparian water rights can exist if a stream or river is flowing through a property, but determination can be complex. Contact the Division of Water Rights for questions and information regarding the water rights associated with your property and how to comply with California Water Code. If a property does not have a water right, the owner will need to file an application for water rights before they can legally divert water. **Unlawful diversions are subject to enforcement actions and civil penalties.**

Central Valley Regional Water Quality Control Board

Redding Office

364 Knollcrest Dr., Ste. 205

Redding, CA 96002

(530) 224-4845

www.waterboards.ca.gov/centralvalley

www.waterboards.ca.gov/centralvalley/water_issues/marijuana/index.shtml

Rancho Cordova Office

11020 Sun Center Dr. #200

Rancho Cordova, CA 95670

(916) 464-3291

Fresno Office

1685 E Street

Fresno, CA 93706

(559) 445-5116

It is illegal to discharge or propose to discharge waste that could affect the quality of the waters of the State without a Waste Discharge Permit, conditional waiver, and/or State Water Quality Certification from the applicable Regional Water Quality Control Board. Upon receiving a report of waste discharge, the Central Valley Regional Water Quality Control Board (Central Valley Water Board) has the non-delegable duty to prescribe requirements that will ensure that the discharge will comply with the Water Quality Control Plan for the Sacramento and San Joaquin River Basins (Basin Plan) and will not result in pollution or nuisance. Any discharge or threat of discharge that is not regulated under waste discharge requirements or a conditional waiver or ignores the employment of best management practices (BMPs) to prevent such discharge is unauthorized and prohibited. Any discharge or threat of discharge due to run-off from unapproved or unauthorized application of soil amendments, fertilizers, and pesticides, or sediment discharges from disturbed areas, have the increased potential for toxicity in non-target aquatic species, may result in fish kills, and/or may affect the quality and other beneficial uses of waters of the state.

Dischargers whose projects disturb one or more acres of soil or whose projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity *Construction General Permit Order 2009-0009-DWQ*. Construction activity subject to this permit includes clearing, grading and disturbances to the ground such as stockpiling, or excavation. Contact your local Central Valley Water Board office to obtain coverage under the Construction General Permit. Additionally, if timber harvesting activities are to be conducted, a Discharger must either enroll and comply with the *Waiver of Waste Discharge Requirements for Discharges Related to Timber Harvesting Activities R5-2014-0144*, or submit a Report of Waste Discharge and apply for Waste Discharge Requirements with the Central Valley Water Board.

The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP must be prepared by a qualified professional and contain a site map(s) which shows the construction site perimeter, existing and proposed buildings, lots, roadways, storm water collection and discharge points, general topography both before and after construction, and drainage patterns across the project. The SWPPP must list BMPs the discharger will use and the placement of those BMPs. Additionally, a SWPPP must contain a visual monitoring program; a chemical monitoring program for "non-visible" pollutants to be implemented if there is a failure of BMPs; and a sediment monitoring plan if the site discharges directly to a water body listed on the 303(d)

list for sediment. Section A of the Construction General Permit describes the elements that must be contained in a SWPPP.

California Department of Fish and Wildlife (CDFW)

Northern Region

601 Locust Street
Redding, CA 96001
Phone: (530) 225-2300
Fax: (530) 225-2055
<https://www.wildlife.ca.gov/>

North Central Region

1701 Nimbus Road
Rancho Cordova, CA 95670
Phone: (916) 358-2900
Fax: (916) 358-2912

Central Region

1234 E. Shaw Avenue
Fresno, CA 93710
Phone: (559) 243-4005 ext.1
Fax: (559) 243-4022

CDFW is charged with administering the California Endangered Species Act (CESA). This law generally states that all native species of fishes, amphibians, reptiles, birds, mammals, invertebrates, and plants, and their habitats, threatened with extinction and those experiencing a significant decline which, if not halted, would lead to a threatened or endangered designation, will be protected or preserved. The CESA emphasizes early consultation with an expert to avoid potential impacts to rare, endangered, and threatened species and to develop appropriate mitigation planning to offset project caused losses of listed species. Activities to develop a site for cannabis cultivation may need to be restricted or limited in areas containing listed plants and animals or their critical habitat in order to fully protect those species.

Fish and Game Code section 1602 requires an entity to notify California Department of Fish and Wildlife (CDFW) prior to commencing any activity that may substantially divert or obstruct the natural flow of any river, stream, or lake; substantially change or use any material from the bed, channel, or bank of any river, stream, or lake; or deposit or dispose of debris, waste or other materials where it may pass into any river, stream, or lake. CDFW requires a Lake or Streambed Alteration Agreement (LSA Agreement) when it determines that the activity may substantially adversely affect existing fish or wildlife resources. An LSA Agreement includes measures necessary to protect existing fish and wildlife resources. Activities which may require an LSA Agreement include the diversion of a stream or creek, construction of a discharge pipe within a stream or creek, depositing material containing crumbled, flaked, or ground pavement into or where it may pass into a stream or creek, or construction of a watercourse crossing. Before issuing an LSA Agreement, CDFW must comply with the California Environmental Quality Act.

Fish and Game Code section 5650 states that it is unlawful to deposit in, permit to pass into, or place where it can pass into the waters of the state, any substance or material that may harm fish, plant life, mammals, or bird life. This includes sediment/soil, petroleum products, fertilizers, pesticide, herbicides, and poisons. Fish and Game Code section 5652 states that it is unlawful to deposit in, permit to pass into, or place where it can pass into the waters of the state OR to abandon, dispose of or throw away, within 150 feet of the high water mark of waters of the state, any cans, bottles, garbage, motor vehicle or parts thereof, rubbish, litter, refuse, waste, debris, or the viscera or carcass of any dead mammal or the carcass of any dead bird.

Cannabis cultivation is prohibited on all public lands, including Forest Service, National Park Service, Bureau of Land Management, and State of California parks, forests, & open spaces. It is illegal to cultivate cannabis on private property without the explicit consent of the property owner.

A person found to have violated section 1602, 5650, or 5652 in connection with the production or cultivation of a controlled substance (i.e., marijuana/cannabis) on land that the person owns, leases, or otherwise uses or occupies with consent of the landowner may be liable for a civil penalty of up to \$8,000 for a violation of section 1602, up to \$20,000 for a violation of section 5650, and up to \$20,000 for a violation of section 5652. Furthermore, a person found to have violated section 1602, 5650, or 5652 while trespassing on public or private land in connection with the production or cultivation of a controlled substance may be liable for a civil penalty of up to \$10,000 for a violation of section 1602, up to \$40,000 for a violation of section 5650, and up to \$40,000 for a violation of section 5652.

California Department of Forestry and Fire Protection (CAL FIRE)

Northern Region

6105 Airport Road
Redding, CA 96002
Phone: 530-224-2489/2490
<http://calfire.ca.gov/>

Southern Region

1234 East Shaw Avenue
Fresno, CA 93710
Phone: 559-222-3714

Commercial tree species may not be removed without first contacting CAL FIRE. If a timberland owner wishes to convert their timberland or sections of their timberland to other non-timber growing uses, they are required to submit a *Less than 3 Acre Conversion Exemption*, a *Public Agency, Public and Private Utility Right of Way Exemption*, a *Notice of Exemption from Timberland Conversion Permit for Subdivision*, or an *Application for Timberland Conversion Permit* to CAL FIRE. These documents must be prepared by a Registered Professional Forester and the operations must be conducted by a Licensed Timber Operator. The *California Forest Practice Rules* must be followed before, during, and after timber operations/timberland conversions. More information can be obtained by contacting your local CAL FIRE office.

California Department of Pesticide Regulation and County Agricultural Commissioners

Pesticides; which include Insecticides, Fungicides, Herbicides, Rodenticides, Molluscicides, and Repellents, are regulated in California by the California Department of Pesticide Regulation and by County Agricultural Commissioners (see contact list at the back of this document). Pesticides should only be used as directed on the container and should never be used in a manner that could expose water bodies to pesticides. **Anyone who uses a pesticide illegally or improperly could be fined or criminally prosecuted.** The Department of Pesticide Regulation has developed a brief synopsis of *Legal Pest Management Practices for Marijuana Growers in California* which can be found at the back of this document.

LOCAL GOVERNMENT

Cities, Counties, and Other Municipalities

Each city and county has planning and zoning rules which regulate land use, lot coverage, and building size (among other things). Many cities and counties have passed ordinances limiting or in some cases prohibiting cannabis cultivation. You should make sure that the type of cannabis cultivation you plan to conduct is allowed in your city, county, and zone. The General Order for Cannabis Cultivation does not supersede local ordinances. The Central Valley Water Board will not issue a permit to cannabis cultivators in cities or counties where this activity has been banned.

Nearly all counties require a grading permit where grading activities have the potential to affect public safety or natural resources. Grading permits serve to:

- Control erosion and sedimentation and prevent damage to off-site property and streams, water courses, and aquatic habitat;
- Avoid creation of unstable slopes or fill structures;
- Prevent impairment or destruction of potential leach fields for sewage disposal systems;
- Regulate de facto development caused by uncontrolled grading.

Most County Grading Permits require an Erosion Control Plan that identifies how erosion of and from the disturbed area will be controlled. There will be a period of time in which the drainage/erosion control structures will have to be maintained and/or replaced. Anyone planning to conduct grading activities should contact the County office in which the site is located to determine applicable permitting, construction, and post construction requirements. For more information consult the Contact List at the back of this document for the appropriate county office to contact.

Tribal Governments

Indian tribal lands or reservations are sovereign lands governed by the tribal government. Cannabis Cultivation is not permitted on tribal lands unless authorized by the tribal government. Cannabis cultivation on Indian tribal lands is subject to federal prosecution.

IDENTIFYING THE ISSUES

In recent years California has experienced an exponential increase in cannabis cultivation. Increased cultivation has produced new threats and impacts to the environment and natural resources. In particular, many northern California water bodies have been negatively affected as a result of increased cannabis cultivation, putting at risk threatened and endangered species as well as the beneficial uses of the State's water resources.

Common threats to water quality and aquatic ecosystems from cannabis cultivation include (but are not limited to) water diversions, sediment loading, petroleum, trash, pesticides, fertilizers, and poisons. Individuals participating in the cultivation of marijuana should make every effort to eliminate the sources of these problems from their growing operations. This document describes a series of Best Management Practices (BMPs) that can and should be applied to grow sites/operations to reduce and prevent environmental damage from cannabis cultivation. This manual is thorough but not exhaustive. For more detailed information on the topics discussed please obtain referenced materials online or by contacting the Central Valley Water Board Redding Office (see contact list). Adherence to applicable BMPs found in this manual is required for compliance with the General Order for Discharges of Waste from Medicinal Cannabis Cultivation in the Central Valley Region (General Order for Cannabis Cultivation).

WATER SUPPLY

Anytime you are taking water from a water body you are creating a water diversion. Water diversions for cannabis cultivation can have extreme negative impacts on the health of aquatic ecosystems. Diverting and/or pumping water from springs, creeks, and rivers during the summer/dry months reduces streamflows and increases water temperatures. In California, a typical cultivated outdoor cannabis plant requires the most water at a time that the majority of the state's water bodies are in their lowest flow period (late summer to fall). This greatly affects the quantity and quality of water available for human and animal consumption, and threatens the survival of endangered salmon, steelhead, and other aquatic life. Illegal water diversions in watersheds where there is a high density of cannabis cultivation operations has led to the dewatering and/or fragmenting of streams that support extremely sensitive and endangered species. If you plan to divert water from a watercourse or water body, **you should first ensure that you have a legal right to that water source**. As good stewards of the environment, marijuana cultivators should develop water storage systems to collect and capture water during the wet season for use during the dry/growing season, in compliance with your water rights. This will help to minimize the impact of cannabis cultivation on aquatic ecosystems during the dry season and is especially important during drought years.

The following BMPs will reduce dependence on natural waters when fish and wildlife need them most:

- Ensure that you have a legal right to your water source by contacting the Division of Water Rights.
- DO NOT obstruct, alter, dam or divert all or a portion of a natural watercourse without notification and approval from CDFW under the Lake and Streambed Alteration Program.
- Regularly inspect your entire water delivery system for leaks and repair leaky faucets and connectors. Line water conveyance ditches/canals to reduce waste and the unreasonable use of water.

- Use rainwater catchment systems to collect and store storm water during the rainy season in tanks, bladders, or engineered ponds to reduce the need for water diversions and/or pumping of groundwater during low flow periods (late summer to fall).
- Install float valves on all water storage systems to keep them from overflowing onto the ground.
- Use Drip/Trickle Irrigation systems and do not overwater your plants. Overwatering not only wastes water but contributes to plant diseases and plagues.
- Use mulch to conserve soil moisture in cultivated areas, pots, and bins. Drip lines and emitters should be under the mulch.
- Water pump intakes should be screened to prevent the entrainment of threatened or endangered aquatic species. Consult Fish and Game Code sections 6020-6028 and/or http://www.dfg.ca.gov/fish/Resources/Projects/Engin/Engin_ScreenCriteria.asp for fish screening criteria.
- Base layout and site development on a qualified expert's recommendations with respect to any listed species protected under California or federal law. Avoid any action that constitutes "take" under the Federal Endangered Species Act or California Endangered Species Act, unless accompanied by an Incidental Take Statement or Incidental Take Permit issued by the appropriate agency.
- More information can be found from the Northern California Farmers Guide at <http://s3.documentcloud.org/documents/691078/bestpracticesguide.pdf> or the Water Storage Guide – Storing water to benefit streamflows and fish in North Coast creeks and rivers at http://agwaterstewards.org/images/uploads/docs/1213661598_Water_Storage_Guide.pdf¹

EROSION & SEDIMENT

Poorly constructed and un-maintained roads, terraces, and excavation sites are a major source of sediment pollution. The heavy winter rains commonly experienced in Northern California pour a tremendous amount of water onto our road systems, discharging large amounts of fine sediment into natural water bodies. Poorly constructed and un-maintained watercourse crossings often lead to catastrophic failures that severely damage roads and nearby water bodies, degrading or eliminating habitat essential to fish and other aquatic life. Use of the following BMPs will reduce the impact that roads, terraces, and excavation in association with cannabis cultivation have on water quality and aquatic ecosystems:

Best Management Practices for all Grading/ Excavation

- An experienced, reputable, and licensed operator should conduct operations if heavy equipment is required to develop roads and the grow site.

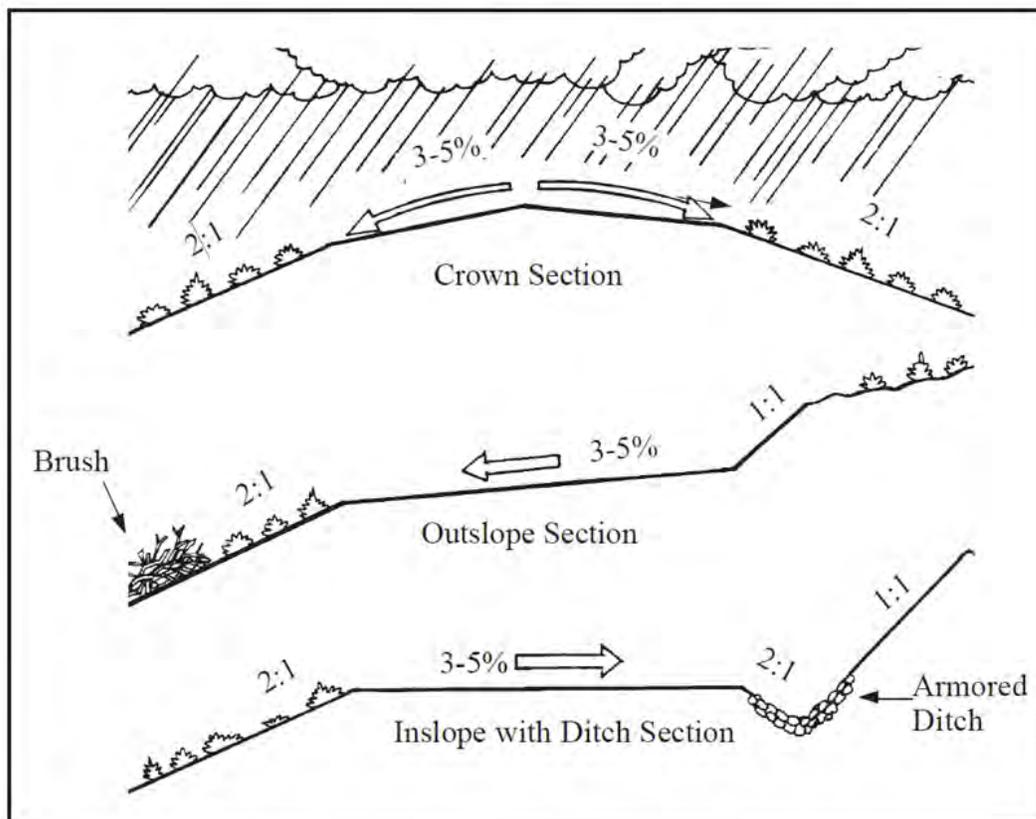
¹ The Central Valley Water Board provides cite to third party documents for informational purposes only and does not necessarily endorse or approve all the information contained therein. It is important to note that persons who are diverting surface flows to water storage for later use must obtain an appropriative water right from the State Water Resources Control Board.

- A licensed timber operator (LTO) must be utilized if any commercial tree species are to be removed from the site.
- Grow site development and road construction should be conducted in a manner that minimizes grading and soil disturbance.
- Avoid cultivating on steep slopes (greater than 30% grade) and disturbing any areas with landslides, gullies, and slips.
- Avoid construction and soil disturbance in the winter and/or during periods of wet weather.
- Seed, mulch, and/or rock areas that have been disturbed by grading, excavation, and/or road construction activities.
- Erosion control mats/blankets and wattles should be used to protect disturbed areas on steep slopes. Native grass seed should be applied to disturbed areas before installation of mats/blankets and wattles. Wattles should be installed on contour to prevent concentrating runoff and mats/blankets should be installed per manufacturer's guidelines.
- Storm water drainage structures should not discharge onto unstable slopes, earthen fills, or directly to a watercourse. Drainage structures should discharge onto stable areas with straw bales, slash, vegetation, and/or rock riprap.
- Regularly check and maintain erosion control/drainage structures and keep culverts clear of debris.
- Haul away excess soil and other debris and locate any stockpiled materials in areas where they can be protected from erosion and will not discharge to a watercourse or lake.
- Compact and contour stored soil/spoils to mimic natural slope contours and drainage patterns to reduce the potential for fill saturation and failure, or erosion, and do not place spoils on top of slash or logs.
- Rip compacted soils prior to placing stored soil/spoils to prevent the potential for ponding which could lead to stored soil/spoil site failure and subsequent sedimentation.
- All necessary drainage/erosion control structures should be in place and functioning, and all areas of exposed soil as a result of grading should be stabilized as soon as possible after grading is complete and before any precipitation event that could cause erosion and/or deliver storm water runoff to a water body.
- Riparian zones should be avoided and vegetation should be maintained to protect watercourses from growing operations.
- Do not service, fuel, or store equipment within 200 feet of surface water bodies.
- Store petroleum products in a covered building with secondary containment at least 200 feet away from surface water bodies.
- More information can be found from the CalTrans Division of Construction, Construction Site BMP Fact Sheets at <http://www.dot.ca.gov/hq/construc/stormwater/factsheets.htm>

Best Management Practices for Road Construction

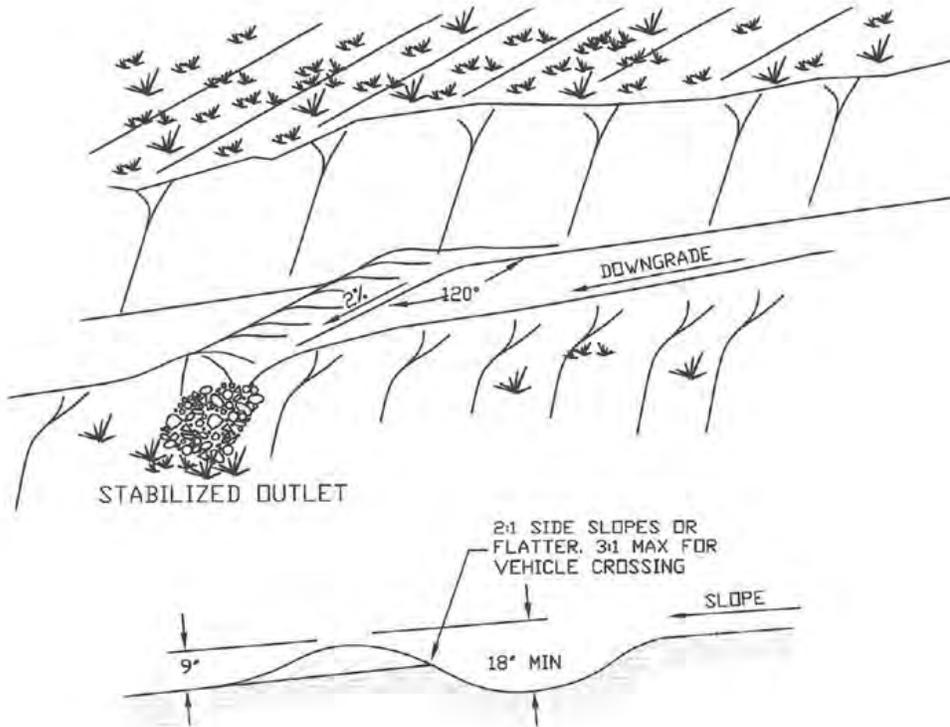
- New roads should be planned and designed to stay as far away from watercourses as possible and to minimize the number of watercourse crossings.
- Decommission or relocate existing roads away from riparian zones whenever possible.

- Blade existing roads in dry weather, but while moisture is still present in soil to minimize dust and maximize compaction to prevent fine sediments from discharging from the road surface.
- DO NOT sidecast bladed material to areas where it can enter a water body directly or be delivered to a water body during a storm event.
- Out-slope roads wherever possible to prevent the concentration of storm water flow within an inboard/inside ditch, to promote even drainage of the road surface, and to minimize disruption of the natural sheet flow pattern off a hill slope to a stream.
- If unable to eliminate inboard/inside ditches, line them with geotextile fabric and/or rock and ensure adequate ditch relief culverts to prevent down-cutting of the ditch and to reduce water runoff concentration and velocity.
- Neither in-sloped nor out-sloped roads should be allowed to develop or show evidence of surface rutting or gullying. Use water bars and rolling dips to break-up slope length, diverting water to well-vegetated or armored areas. The distance between water bars and/or rolling dips should not exceed 150 feet, and that distance should be shortened for roads with steep grades (greater than 15%) or with an easily erodible surface.
- Use gravel to “weatherproof” roads used during the winter or wet weather periods.



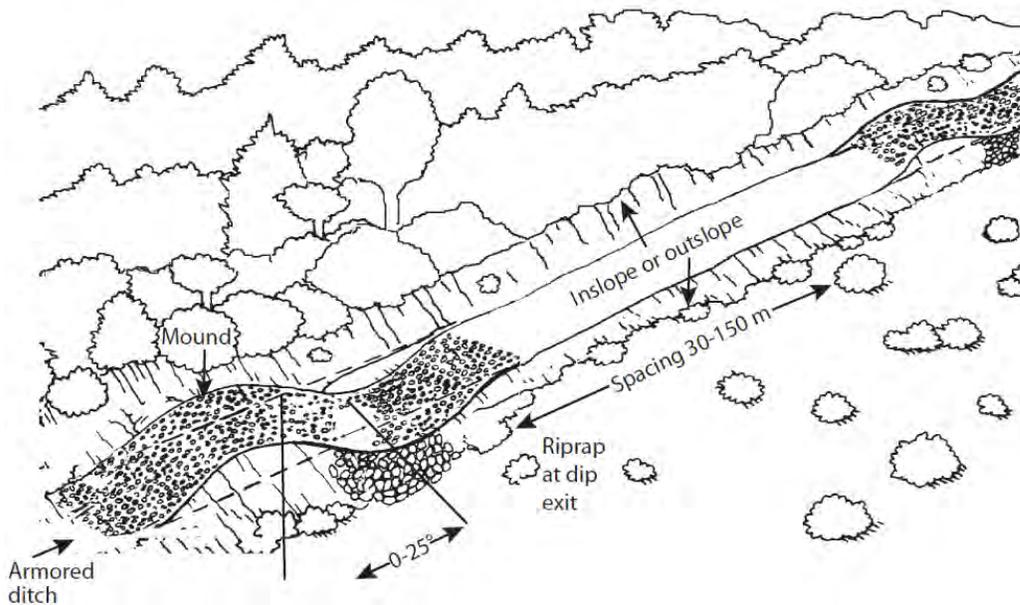
Cross sectional views of typical road drainage options

Image from Keller and Sherar 2003



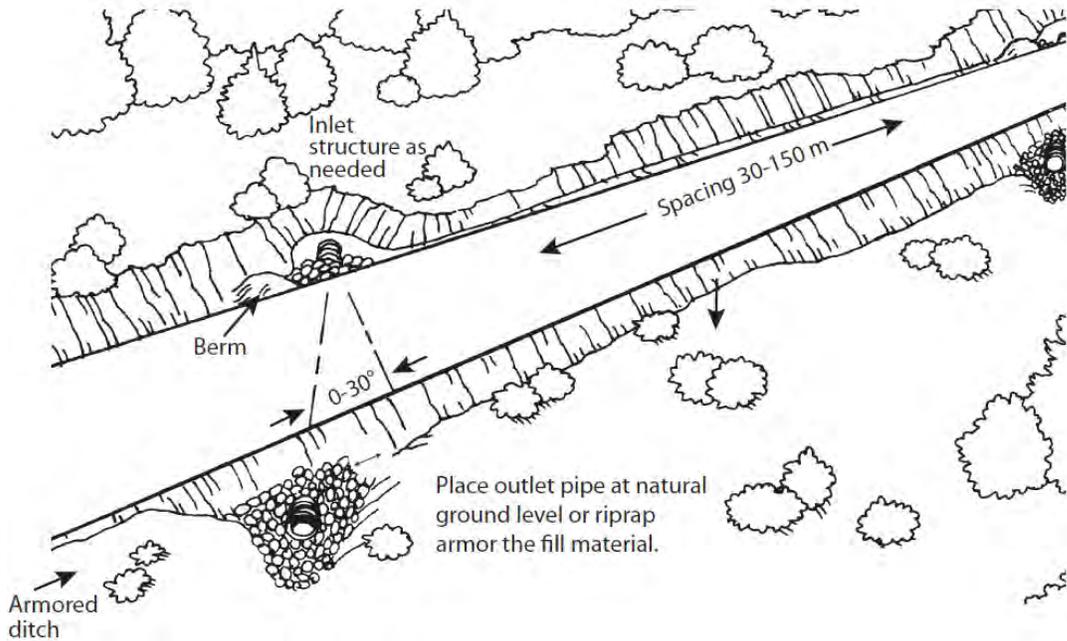
Construct water bars and/or rolling dips no more than 150 feet apart or 100-50 feet apart on steeper slopes and/or when road surface is easily erodible.

Image from Best Management Practices for Agricultural Erosion and Sediment Control, Sonoma County Agricultural Commissioner's Office



Rolling dip on an out-sloped road. Proportions exaggerated for clarity.

Image from Keller and Sherar 2003

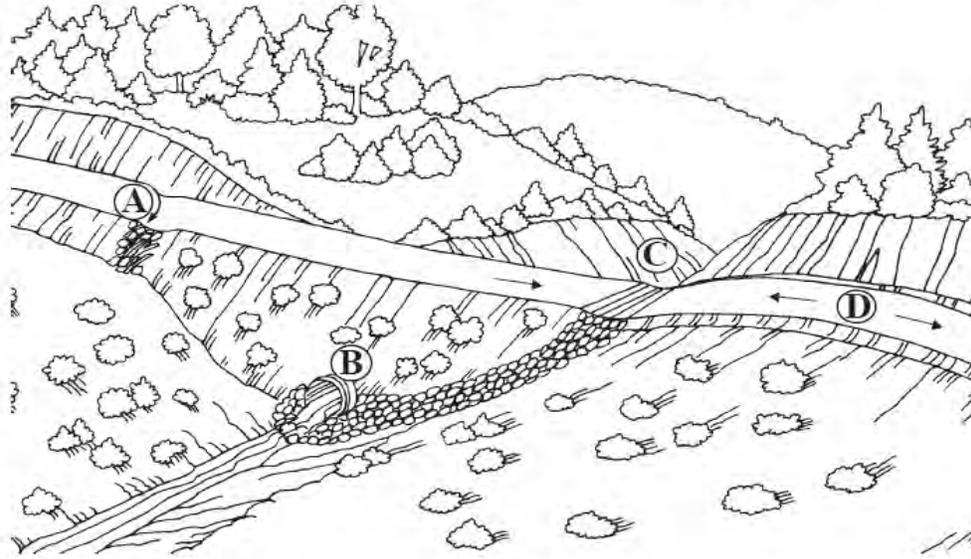


Ditch relief culvert on an in-sloped road section.

Image from Keller and Sherar 2003

- All road watercourse crossing structures should allow for the unrestricted passage of water and should be designed to accommodate the 100-year flood flow. Consult CAL FIRE 100 year Watercourse Crossings document for examples and calculations (minimum of 18" diameter for all culverts) http://www.calfire.ca.gov/resource_mgt/downloads/reports/ForestryReport1.pdf
- Road watercourse crossing structures on watercourses that support fish should be constructed for the unrestricted passage of fish at all life stages, and require permitting from CDFW.
- Culverts used at watercourse crossings should be of sufficient length to extend beyond fill/sidecast material, and should be installed at the same level and gradient of the stream bed in which they are being placed.
- Culverts used at watercourse crossings should be designed to direct flow and debris toward the inlet using wing-walls, beveling of the pipe, rock armoring, etc.
- Low-water or ford style watercourse crossings should be armored along the bed and banks with clean durable rock of a sufficient size as not to move downstream during high flow periods, yet without creating a damming effect on the flow. Rock must also be placed on either side to the break in slope to prevent water from diverting around the material.
- Stream crossing structures should be designed, constructed, and maintained to prevent stream diversion in the event that the crossing becomes plugged.
- More information can be found in the Low-Volume Roads Engineering Best Management Practices Field Guide by G. Keller and J. Sherar (Keller and Sherer 2003) at http://pdf.usaid.gov/pdf_docs/PNADB595.pdf or from the Handbook for Forest, Ranch, & Rural Roads by Weaver, W.E., Weppner, E.M. and Hagans, D.K., 2014 at <http://www.pacificwatershed.com/sites/default/files/RoadsEnglishBOOKapril2015b.pdf>

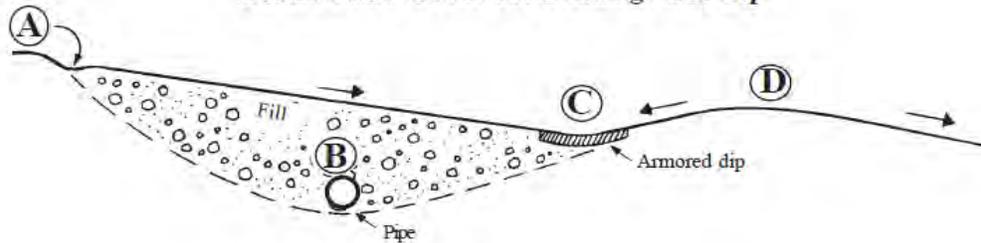
Culvert Installed with Protection using an Armored Overflow Dip to Prevent Washout and Fill Failure



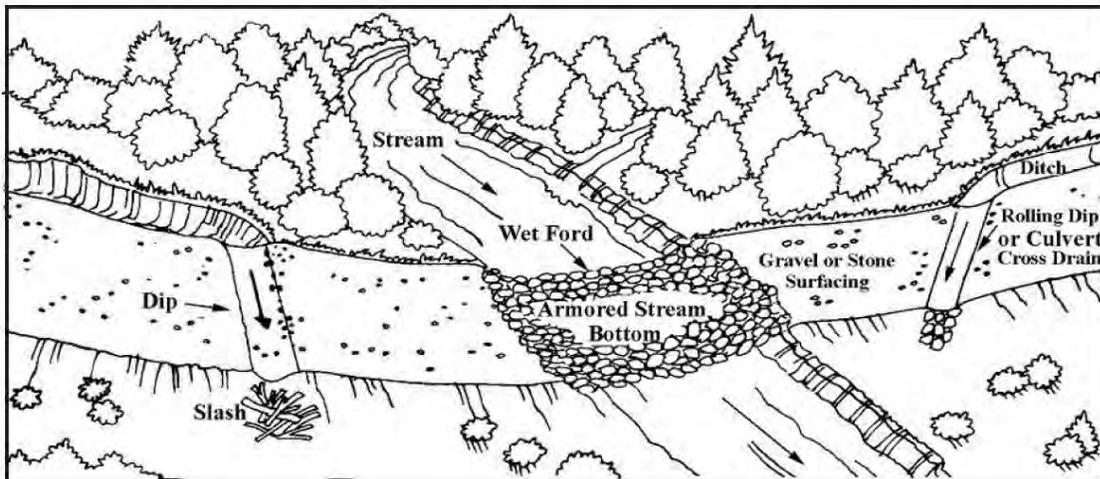
- (A) Roadway Cross Drain (Dip)
- (B) Culvert
- (C) Overflow Protection Dip
- (D) High point in the road profile

Watercourse crossing using a critical dip to protect fill material from discharging to the stream in the event that the culvert becomes plugged.

Road Profile Across the Drainage and Dip



Images from Keller and Sherar 2003; Adapted from Weaver and Hagans, 1994



Ford style crossing

Image from Keller and Sherar 2003

POTTING SOIL, AMENDMENTS, FERTILIZERS, PESTICIDES, POISONS & PETROLEUM PRODUCTS

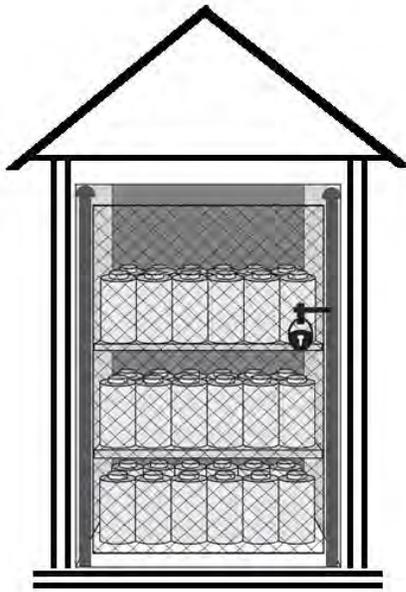
Potting soil, amendments, and fertilizers contain excess nutrients, particularly nitrogen and phosphorous, that can pollute water bodies, contribute to toxic algae blooms, and deplete the dissolved oxygen that fish and other aquatic species need to survive. **Pesticides can lead to many unintended negative effects, and often are easily mobilized by storm water runoff making it especially important to keep them away from water bodies.** There are many effective practices for controlling pests and enhancing soil and plant growth that do not require chemical fertilizers or pesticides. **Poisons** used to exterminate garden pests such as rats, mice, gophers, and moles **can move up through the food chain and cause secondary kills of family pets, and predators such as owls, bobcats, foxes, and endangered fishers.** Petroleum products, such as gasoline, diesel, oil and grease, are toxic to aquatic wildlife and commonly spill or leak from vehicles, equipment, and storage areas then wash into water bodies during rain events. Over/improper use and storage of potting soil, amendments, fertilizers, pesticides, poisons and petroleum products can lead to significant soil and water contamination.

*At present time, there are no pesticides registered specifically for use on cannabis, and the use of pesticides on cannabis plants has not been reviewed for safety, human health effects, or environmental impacts. Under California law, the only pesticide products not illegal to use on cannabis are those that contain an active ingredient that is exempt from residue tolerance requirements and either registered and labeled for a broad enough use to include use on cannabis or exempt from registration requirements as a minimum risk pesticide under FIFRA section 25(b) and the California Code of Regulations, title 3, section 6147.

The following BMPs should be implemented when using potting soil, amendments, fertilizers, pesticides, poisons, and petroleum products.

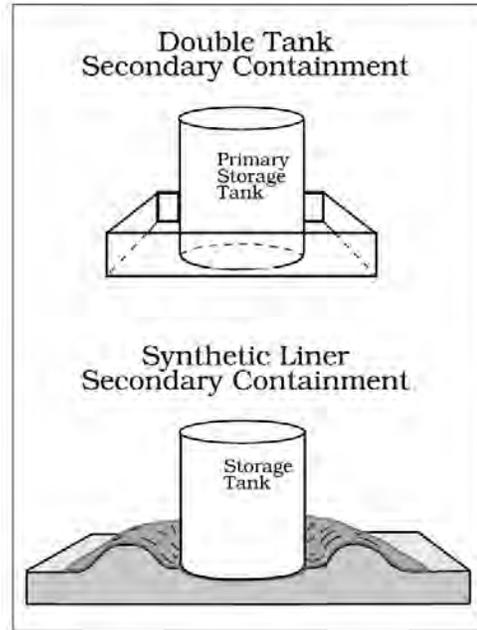
BMPs for Potting Soil, Amendments, Fertilizers, Pesticides, Poisons & Petroleum Products

- Pesticides and fertilizers should be kept in their original containers and the containers should be stored in a building, to prevent exposure to sunlight and precipitation, with secondary containment in the case of leaks or spills.
- Separate storage areas should be established so that pesticides, fertilizers, and petroleum products can all be stored separately.
- Any uses of fertilizers, pesticides, poisons, and petroleum products shall be consistent with the product's labelling.
- Do not over use or over apply pesticides and fertilizers (plants can only absorb about 15% of applied inputs at one time and over application can lead to many diseases).
- Pesticides, fertilizers, and petroleum products should be mixed/prepared and loaded on an impermeable pad at least 200 feet away from surface water bodies.
- Recycle empty pesticide, fertilizer, and petroleum product containers whenever possible. Never burn or dispose of containers by dumping them. It is illegal to litter or dump waste within 150 feet of the high water mark of a stream or water body.



Left – Covered Locked Storage

Right – Examples of Secondary Containment Storage



- Potting soil, when not in use, should be placed where it can be protected from rainfall and erosion, and will not deliver sediment to a watercourse or lake.
- Attract beneficial insects to your grow by inter-planting a mix of yarrow, cilantro, parsley, dill, or coreopsis; insect pests are often plant specific, when plants are mixed pests are less likely to spread
- Use naturally insecticidal plants such as chrysanthemums and pyrethrum daisies planted around or throughout a grow to repel a variety of flying insects and pests. Pulverized and manufactured forms of pyrethrum can be harmful to fish and should be avoided when possible.
- Use compost and compost teas instead of chemical fertilizers to increase beneficial microorganisms and nutrients in your soils.
- Install or leave vegetated buffers around the perimeter of a grow area to filter runoff and sediment and to intercept and uptake excess nutrients.
- Above ground petroleum product storage tanks and containers should have a secondary means of containment for the entire capacity of the largest single container and sufficient freeboard to contain precipitation.
- Underground storage tanks 110 gallons and larger should be registered with the appropriate County Health Department and comply with State and local requirements for leak detection, spill overflow, corrosion protection, and insurance coverage.
- If there is a spill or accidental discharge in or on any waters of the state immediately notify the Office of Emergency Services so that the local health officer can decide what actions, if any, may need to be taken to protect public safety. **HAZMAT SPILL NOTIFICATIONS 1 (800) 852-7550 or (916) 845-8911.**
- For more information on non-chemical pest control methods, consult the *Legal Pest Management Practices for Marijuana Growers in California* informational addendum at the back of this document.

Definitions.

“Bank” means any land surface above the ordinary high water line that adjoins a body of water and contains it except during floods. Bank also includes all land surfaces of islands above the ordinary high water line that adjoin a body of water and that are below the flood elevation of their surrounding body of water.

“Bed” means the land below the ordinary high water lines of a watercourse.

“Beneficial Use” means the uses of the waters of the state that may be protected against quality degradation. These include, but are not limited to, domestic, municipal, agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves.

“Berm” means a curb, dike, or linear mound of earth that is constructed to control water and direct roadway runoff waters or that has developed through road grading activities.

“Excess Material” means excavated material that is left over from construction/reconstruction or grading activities. Excess material is synonymous with spoils.

“Fill” means material that is mechanically placed and built up in compacted lifts to form a roadbed or terrace surface. Fill includes the material placed around culverts and related drainage structures at watercourse crossings.

“Ford” means a road watercourse crossing where the road grade dips through the watercourse channel without the use of a culvert or other structure.

“Grow site” means the space of ground including and immediately adjacent to the area where work is conducted for cultivating and harvesting marijuana.

“Insloping” means shaping the road or terrace surface to drain toward the cut slope or inside edge of the hillside, usually to an inside ditch. In-sloped roads require additional drainage to prevent increased runoff velocity, down-cutting of the ditch and potential failure of the road prism.

“Ordinary high water line” means the elevation of the top of the bed of the channel of a watercourse and is delineated from evidence upon the landscape, commonly the point where the natural vegetation changes from predominantly aquatic to predominantly terrestrial.

“Outsloping” means shaping the road or terrace surface to drain toward the fill slope or outside edge of the hillside. Out-sloped roads require additional drainage to ensure stormwater runoff does not have opportunity to concentrate.

“Pesticides” means 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, which may infest or be detrimental to vegetation, man, animals, or households, or be present in any

agricultural or nonagricultural environment whatsoever and includes; herbicides, fungicides, rodenticides, miticides, and insecticides.

“Road” means a linear feature with a specially prepared surface over which vehicles can pass.

“Sidecast” means excess earthen material pushed or dumped over the side of a road or terrace, often during construction, reconstruction or maintenance activities.

“Secondary Containment” means a system built around pesticide and fertilizer containers to capture products that may leak or spill.

“Take” means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.

“Terrace” means a flat, natural or excavated, area on a hillside.

“Terracing” means to cut into a hillside a series of successively receding flat surfaces or platforms for the purpose of establishing additional flat space.

“Waste” includes sewage and any and all other waste substances, liquid, solid, gaseous, or radioactive, associated with human habitation, or of human or animal origin, or from any producing, manufacturing, or processing operation, including waste placed within containers of whatever nature prior to, and for the purposes of, disposal.

“Water body” means any significant accumulation of water, such as: lakes, ponds, rivers, streams, creeks, wetlands, and canals.

“Watercourse” means any well-defined channel with distinguishable bed and bank showing evidence of having contained flowing water indicated by depositions of rock, gravel, sand, or soil.

“Riparian Zone” means a strip of land, along both sides of a watercourse or around the circumference of a lake or spring, where additional practices may be required for protection of the quality and beneficial uses of water, fish, riparian wildlife habitat, and for controlling erosion.

“Waters of the State” means any surface water or groundwater, including saline waters, within the boundaries of the state of California.

CONTACT LIST

Sacramento Central Valley Water Board Office	11020 Sun Center Dr. Suite 200 Rancho Cordova, CA 95670	Phone: (916) 464-3291 Fax: (916) 464-4645
Fresno Central Valley Water Board Office	1685 "E" Street Fresno, CA 93706	Phone: (559) 445-5116 Fax: (559) 445-5910
Redding Central Valley Water Board Office	364 Knollcrest Dr. Suite 205 Redding, CA 96002	Phone: (530) 224-4845 Fax: (530) 224-4857
California Department of Water Resources	1416 9 th Street Sacramento, CA 95814	Phone: (916) 653-5791
State Water Resources Control Board – Division of Water Rights	1001 I Street Sacramento, CA 95814	Phone: (916) 341-5300
California Department of Fish & Wildlife Northern Region	601 Locust St. Redding, CA 96001	Phone: (530) 225-2300 Fax: (530) 225-2055
California Department of Fish & Wildlife North Central Region	1701 Nimbus Rd. Rancho Cordova, CA 95670	Phone: (916) 358-2900 Fax: (916) 358-2912
California Department of Fish & Wildlife Central Region	1234 E. Shaw Ave. Fresno, CA 93710	Phone: (559) 243-4005 ext. 151 Fax: (559) 243-4022
California Department of Pesticide Regulation	1001 "I" Street Sacramento, CA 95812	Phone: (916) 445-4300
Amador County Department of Public Works	810 Court Street Jackson, CA 95642	Phone: (209) 223-6429 Fax: (209) 223-6395
Butte County Department of Development Services	7 County Center Dr. Oroville, CA 95965	Phone: (530) 538-7601 Fax: (530) 538-7785
Calaveras County Department of Public Works	891 Mountain Ranch Road San Andreas, CA 95249-9709	Phone: (209) 754-6402 Fax: (209) 754-6664
Colusa County Department of Public Works	1215 Market St. Colusa, CA 95932	Phone: (530) 458-0466 Fax: (530) 458-2035
Contra Costa County Department of Conservation & Development	30 Muir Road Martinez, CA 94553	Phone: (925) 674-7204 Fax: (925) 674-7267
El Dorado County Building Safety Services	2850 Fairlane Court, Building C Placerville, CA 95667	Phone: (530) 621-5315 Fax: (530) 622-1708
Fresno County Department of Public Works & Planning	2220 Tulare Street Annex A & B Fresno, CA	Phone: (559) 600-4022
Glenn County Planning & Public Works Agency	777 N. Colusa St. Willows, CA 95988	Phone: (530) 934-6530 Fax: (530) 934-6533
Lake County Community Development Department	255 N. Forbes Street Lakeport, CA 95453	Phone: (707) 263-2221 Fax: (707) 263-2225
Lassen County Department of Planning and Building Services	707 Nevada Street, Suite 5 Susanville, CA 96130	Phone: (530) 251-8269 Fax: (530) 251-8373
Kern County Engineering, Surveying & Permit Services	Public Services Building 2700 M Street, Suite 570 Bakersfield, CA 93301-2370	Phone: (661) 862-5100 Fax: (661) 862-5101
King County Department of Public Works	1400 W Lacey Blvd Hanford, CA 93230	Phone: (559) 852-2700

Madera County Building Division	Suite 3100, Government Center Madera, CA 93637	Phone: (559) 675-7821 Fax: (559) 675-6573
Mariposa County Building Department	5100 Bullion St P.O. Box 1268 Mariposa, CA 95338	Phone: (209) 966-3934 Fax: (209) 742-5024
Merced County Department of Public Works Building & Safety Division	2222 M St, Second Floor Merced, CA 95340	Phone: (209) 385-7477 Fax: (209) 385-7302
Modoc County Planning Department	203 W. 4 th Street Alturas, CA 96101	Phone: (530) 233-6406 Fax: (530) 233-6420
Napa County Department of Public Works Engineering Services Division	1195 Third Street, 2 nd Floor Napa, CA 94559	Phone: (707) 253-4351 Fax: (707) 253-4627
Nevada County Building Department	950 Maidu Avenue Suite 170 Nevada City, CA 95959	Phone: (530) 265-1222
Placer County Community Development Department, Engineering & Surveying Division	3091 County Center Dr. Auburn, CA 95603	Phone: (530) 745-3110 Fax: (530) 745-7589
Plumas County Engineering Department	555 Main St. Quincy, CA 95971	Phone: (530) 283-6222 Fax: (530) 283-6134
Sacramento County Division of County Engineering	827 7 th Street, Room 102 Sacramento CA, 95814	Phone: (916) 874-6544 Fax: (916) 854-9229
San Joaquin County Community Development Department	1810 E. Hazelton Avenue Stockton CA 95205	Phone: (209) 468-3121
Sierra County Department of Planning and Building	101 Courthouse Sq. Downieville, CA 95936	Phone: (530) 289-3251 Fax: (530) 289-2828
Shasta County Department of Resource Management	1855 Placer St. Redding, CA 96001	Phone: (530) 225-5789 Fax: (530) 225-5807
Siskiyou County Community Development Department	806 South Main Street Yreka, CA 96097	Phone: (530) 841-2100 Fax: (530) 841-4076
Solano County Department of Public Works	675 Texas Street, Suite 5500 Fairfield, CA 94533-6341	Phone: (707) 784-3177 Fax: (707) 784-2894
Stanislaus County Department of Public Works	1716 Morgan Rd Modesto, CA 95358	Phone: (209) 525-4130
Sutter County Development Services	1130 Civic Center Blvd, Suite A Yuba City, CA 95993	Phone: (530) 822-7400
Tehama County Planning Department	444 Oak St. Room I Red Bluff, CA 96080	Phone: (530) 527-2200 Fax: (530) 527-2655
Tulare County Resource Management Agency	5961 South Mooney Blvd. Visalia, CA 93277	Phone: (559) 624-7000 Fax: (559) 730-2653
Tuolumne County Community Resources Agency	A.N. Francisco Building Floors 3 & 4 48 Yaney Ave Sonora, CA 95370	Phone: (209) 533-5633 Fax: (209) 533-5616
Yolo County Building Inspection Services	292 West Beamer Street Woodland, CA 95695	Phone: (530) 666-8775 Fax: (530) 666-8156

Yuba County Community Development & Services Agency	915 8 th Street, Suite 123 Marysville, CA 95901	Phone: (530) 749-5430 Fax: (530) 749-5434
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County Agriculture Commissioners

County	Commissioner	Address	Telephone / Fax	General County E-mail
Amador	Patricia Lesky	12200-B Airport Rd Jackson, CA 95642	P: (209) 223-6487 F: (209) 223-3312	agriculture@co.amador.ca.us
Butte	Richard Price	316 Nelson Ave Oroville, CA 95965-3318	P: (530) 538-7381 F: (530) 538-7594	butteag@buttecounty.net
Calaveras	Kevin Wright	P: 23 E. St. Charles M: 891 Mountain Ranch Rd San Andreas, 95249-9709	P: (209) 754-6504 F: (209) 754-9256	agpublic@co.calaveras.ca.us
Colusa	Joseph Damiano	100 Sunrise Blvd., Suite R Colusa, CA 95932	P: (530) 458-0580 F: (530) 458-5000	jdamiano@countyofcolusa.org
Contra Costa	Chad Godoy	2366 A. Stanwell Circle Concord, 94520-4804	P: (925) 646-5250 F: (925) 646-5732	chad.godoy@ag.cccounty.us
El Dorado	Charlene Carveth	311 Fair Lane Placerville, CA 95667	P: (530) 621-5520 F: (530) 626-4756	eldcag@edcgov.us
Fresno	Les Wright	1730 S Maple Ave Fresno, 93702-4596	P: (559) 600-7510 F: (559) 455-2415	fresnoag@co.fresno.ca.us
Glenn	Jim Donnelly	P: 720 N Colusa Street M: PO Box 351 Willows, 95988-0351	P: (530) 934-6501 F: (530) 934-6503	agcommr@countyofglenn.net
Kern	Ruben Arroyo	1001 S Mount Vernon Ave Bakersfield, 93307-2857	P: (661) 868-6300 F: (661) 868-6301	agcomm@co.kern.ca.us
Kings	Tim Niswander	680 N Campus Dr. Suite B Hanford, 93230-5923	P: (559) 582-3211 F: (559) 582-5251	agstaff@co.kings.ca.us
Lake	Steven Hajik	883 Lakeport Blvd Lakeport, CA 95453	P: (707) 263-0217 F: (707) 263-1052	lakecoag@co.lake.ca.us
Lassen	Joe Moreo	175 Russell Ave Susanville, 96130-4299	P: (530) 251-8110 F: (530) 257-6515	Chemphill@co.lassen.ca.us
Madera	Stevie McNeill	332 Madera Ave Madera, 93637-5499	P: (559) 675-7876 F: (559) 674-4071	Stephanie.mcneill@co.madera.ca.gov
Mariposa	Cathi Boze	P: 5009 Fairgrounds Rd M: PO Box 905 Mariposa, 95338-0905	P: (209) 966-2075 F: (209) 966-2056	agcomm@mariposacounty.org
Merced	David Robinson	2139 Wardrobe Ave Merced, CA 95341-6445	P: (209) 385-7431 F: (209) 725-3536	agdeptmail@co.merced.ca.us
Modoc	Joe Moreo	202 W 4th Street Alturas, 96101-3915	P: (530) 233-6401 F: (530) 233-5542	agcommissioner@co.modoc.ca.us
Napa	Greg Clark	1710 Soscol Ave, Suite 3 Napa, CA 94559	P: (707) 253-4357 F: (707) 253-4881	agcommissioner@countyofnapa.org
Nevada	Chris Flores	255 Auburn Street Grass Valley, CA 95945	P: (530) 273-2648 F: (530) 273-1713	agdept@co.nevada.ca.us
Placer	Joshua Huntsinger	11477 E Avenue Auburn, CA 95603	P: (530) 889-7372 F: (530) 823-1698	placerag@placer.ca.gov

Plumas & Sierra	Tim Gibson	208 Fairgrounds Road Quincy, 95971-9462	P: (530) 283-6365 F: (530) 283-4210	timgibson@countyofplumas.com
Sacramento	Juli Jensen	4137 Branch Center Rd Sacramento, CA 95827	P: (916) 875-6603 F: (916) 875-6150	AGCOMM@sacounty.net
San Joaquin	Tim Pelican	2101 East Earhart Ave, Stockton, 95206-3294	P: (209) 953-6000 F: (209) 953-6022	Stockonag2@sjgov.org
Shasta	Paul Kjos	3179 Bechelli Lane, St 210 Redding, 96002-2041	P: (530) 224-4949 F: (530) 224-4951	shastaag@co.shasta.ca.us
Siskiyou	Pat Griffin	525 S Foothill Drive Yreka, 96097-3090	P: (530) 841-4033 F: (530) 842-6690	pgriffin@co.siskiyou.ca.us
Solano	Jim Allan	501 Texas St, 2 nd Floor Fairfield, CA 94533	P: (707) 784-1310 F: (707) 784-1330	agcomm48@solanocounty.com
Stanislaus	Milton O'Haire	3800 Cornucopia Way, Suite B Modesto, 95358-9494	P: (209) 525-4730 F: (209) 525-4790	agcom50@stancounty.com
Sutter	Mark Quisenberry	142 Garden Highway Yuba City, CA 95991	P: (530) 822-7500	sutterag@co.sutter.ca.us
Tehama	Rick Gurrola	P: 1384 Walnut Street M: PO Box 38 Red Bluff, 96080	P: (530) 527-4504 F: (530) 529-1049	rgurrola@tehamaag.net
Tulare	Marilyn Kinoshita	4437 S Laspina Street Tulare, 93274	P: (559) 684-3350 F: (559) 685-3335	mkinoshi@co.tulare.ca.us
Tuolumne	Gary Stockel	P: 22365 S Airport Rd. M: 2 S Green St Sonora, CA 95370-4617	P: (209) 533-5691 F: (209) 533-5520	gstockel@co.toulumne.ca.us
Yolo	Dennis Chambers	70 Cottonwood Street Woodland, CA 95695-2557	P: (530) 666-8140 F: (530) 662-6094	dennis.chambers@yolocounty.org
Yuba	Louie Mendoza Jr	915 8 th Street, Suite 127 Marysville, CA 95901	P: (530) 749-5400 F: (530) 749-5404	YubaAg@co.yuba.ca.us

Type of Licensed Professional	CA Professional License Title	Typical areas of expertise and project work
Civil, Hydraulic, or Structural Engineer	CE – Civil Engineer	Bridge designs, fish passage, in-stream structures, embankments, and general road construction design and construction
Geotechnical Engineer	GE – Geotechnical Engineer	Design earthworks, bridge and structure foundations; evaluate soil and rock mechanics in relation to development; geologic risk analysis
Engineering Geologist	CEG – Certified or Registered Engineering Geologist	Geologic investigations; assessment, design and remediation of mass wasting or slope instabilities; existing and potential in-stream structures and grad control; stream crossings, and general road construction and reconstruction. General road construction project oversight.
Geologist	PG/RG – Professional or Registered Geologist	Assessment and subsurface drainage of landslide or fill instabilities; existing and potential in-stream structures and stream crossing designs; and general road construction and maintenance. General road construction project oversight.
Forester	RPT – Registered Professional Forester	Timber harvest plans and other forest management issues; general road planning, design and construction oversight.
Landscape Architect	LLA – Licensed Landscape Architect	General road construction and maintenance design and oversight (excluding landslide or fill instability assessment).
Landscaping Contractor	(CA-C27) – Landscape Contractor License – SL	Constructs, maintains, repairs, installs, or subcontracts the development of landscape systems and facilities for public and private gardens and other areas which are designed to aesthetically, architecturally, horticulturally, or functionally improve the grounds within or surrounding a structure or a tract or plot of land
General Engineering Contractor	(CA-A) General Engineering Contractor License – CG	Performs land leveling and earthmoving projects, excavating, grading, trenching, paving and surfacing work and cement and concrete works in connection with highways, streets and roads, as well as other types of fixed works requiring specialized engineering knowledge and skill.
Earthwork and Paving Contractor	(CA-C12) Earthwork and Paving Contractor License	Digs, moves, and places material in such a manner that a cut, fill, excavation, grade, trench, backfill, or tunnel can be executed.
Biologist, Archaeologist, Hydrologist	Specific certification depending on area of expertise	Investigations pertaining to the presence of endangered animal and plant species; or sensitive habitats (e.g., wetlands); cultural resources; or surface water hydrology, respectively.

Attachment B

Notice of Intent to Obtain Coverage for Tier 1, Tier 2, and Tier 3
Cultivators

Central Valley Regional Water Quality Control Board

Notice of Intent (NOI) for Medicinal Cannabis Cultivation Tiers 1, 2, and 3
(Application for Coverage under General Order for Cannabis Cultivation)

1. Cannabis Cultivation Site Information:

Cultivator's Name	Cultivator's Phone
County of Cultivation Site(s)	Cultivation Site's Assessor's Parcel Number(s)

2. Landowner(s) Information:

Name	Phone	
Address		
City	State	Zip code

3. Waiver Category: (see instruction page for category requirements and submittal instructions)

<input type="checkbox"/> Tier 1: Cannabis Cultivators whose cultivation areas and associated facilities are located on less than 30% slopes ¹ , occupy and/or disturb less than 1/4 acre ² , AND are not located within 200 feet of a wetland ³ , Class I or II watercourse ⁴ . PLEASE COMPLETE SECTIONS 1, 2, 3, AND 6 ONLY
<input type="checkbox"/> Tier 2: Cannabis Cultivators whose cultivation areas and associated facilities are located on less than 30% slopes ¹ , occupy and/or disturb less than 1 acre and less than 50% of the Cultivator's/Landowner's parcel, AND are not located within 200 feet of a wetland ³ , Class I or II watercourse ⁴ . PLEASE COMPLETE SECTIONS 1-6 (COMPLETE SECTION 5 ONLY IF YOU ARE SEEKING COVERAGE FOR A NEW OR EXPANDING SITE)
<input type="checkbox"/> Tier 3: Cannabis Cultivators whose cultivation areas and associated facilities are located on greater than 30% slopes ¹ , occupy and/or disturb more than 1 acre ² or more than 50% of the Cultivator's/Landowner's parcel, OR are within 200 feet of a wetland ³ , Class I or II watercourse ⁴ . <u>A Site Management Plan describing practices that you will implement on the Site to minimize impacts to surface and ground waters must be attached to this NOI.</u> PLEASE COMPLETE SECTIONS 1-6 (COMPLETE SECTION 5 ONLY IF YOU ARE SEEKING COVERAGE FOR A NEW OR EXPANDING SITE)

4. Facility Classification: New or Existing Tier 2 and 3 Cultivators

<p>Was the cannabis cultivation site developed as of October 2, 2015?</p>	<input type="checkbox"/> No. I am seeking coverage for a new or expanding cannabis cultivation site. PLEASE COMPLETE SECTION 5. ENVIRONMENTAL COMPLIANCE ASSESSMENT <input type="checkbox"/> Yes. I am seeking coverage for an existing cannabis cultivation site.
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5. Environmental Compliance Assessment for New or Expanded Growers

I. OTHER WATER QUALITY PERMITS	
a. Will development of your site result in impacts to wetlands/vernal pools?	<input type="checkbox"/> No. <input type="checkbox"/> Yes. A Copy of an Army Corps Section 404 Permit or justification for use of a Nationwide Permit is attached to this Notice of Intent, along with any required 401 Certification issued by the Central Valley Water Board.
b. Will the development of your site: <ul style="list-style-type: none"> • Divert or obstruct the natural flow of, or substantially change, any river, stream, or lake? • Utilize material from the bed, channel, or bank of any river, stream, or lake? • 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? 	<input type="checkbox"/> No to all. <input type="checkbox"/> Yes. A Section 1602 Streambed Alteration Agreement is attached to this NOI, along with a copy of the receipt for the regulatory fee paid to the California Department of Fish and Wildlife.
c. Will development of your Site disturb one or more acres of soil, or is it part of a larger common plan of development that, in total, will disturb one or more acres?	<input type="checkbox"/> No. <input type="checkbox"/> Yes. A copy of a submitted Notice of Intent to enroll in the Construction General Stormwater Permit, State Water Board Order No. 2009-0009-DWQ, is attached to this NOI.
II. TIMBERLAND CONVERSION PERMIT	
a. Will development of your site result in the removal of commercial tree species?	<input type="checkbox"/> No. <input type="checkbox"/> Yes. A copy of a <i>Less than 3 Acre Conversion Exemption, a Public Agency, Public and Private Utility Right of Way Exemption, a Notice of Exemption from Timberland Conversion Permit for Subdivision, or an Application for Timberland Conversion Permit</i> is attached to this NOI.
III. LOCAL PERMITS	
a. Does the County in which you are proposing to grow cannabis prohibit the cultivation of cannabis, or is cannabis cultivation not an allowed land use for your property under your County's General Plan?	<input type="checkbox"/> No. <input type="checkbox"/> Yes. IF "YES" THE BOARD CANNOT ENROLL YOUR SITE UNDER THIS GENERAL ORDER.
b. Will the development of your site result in the grading of more than 50 cubic yards of earthen material?	<input type="checkbox"/> No. <input type="checkbox"/> Yes. A County Grading Permit and any required Erosion Control Plan is attached to this NOI. <input type="checkbox"/> Development is conditionally exempt or does not require a grading permit

<p>c. If you are constructing a structure, have the construction plans been approved by the appropriate local building department?</p>	<p><input type="checkbox"/> No structure is being built. <input type="checkbox"/> No structure is being built that requires local approval. <input type="checkbox"/> Yes. All relevant correspondence and approvals from the local building department is attached.</p>
<p>IV. PROTECTION OF SENSITIVE SPECIES</p>	
<p>a. Have you completed a biological site assessment (BSA) prepared by a qualified wildlife biologist for the project site?</p>	<p><input type="checkbox"/> No. <input type="checkbox"/> Yes. A BSA that describes whether there are any sensitive biological resources such as wetlands, streams, or habitats for special status species and that maps all biological constraints on site development plans is attached. IF "NO" THE BOARD CANNOT ENROLL YOUR SITE UNDER THIS GENERAL ORDER.</p>
<p>b. Did the BSA determine that special-status species could be affected by site development activities?</p>	<p><input type="checkbox"/> No. <input type="checkbox"/> Yes. IF "YES" THE BOARD CANNOT ENROLL YOUR SITE UNDER THIS GENERAL ORDER. YOU MUST SUBMIT AN INDIVIDUAL RWD TO THE BOARD TO RECEIVE REGULATORY COVERAGE AND ADDITIONAL CEQA COMPLIANCE MAY BE REQUIRED.</p>
<p>V. CULTURAL RESOURCES</p>	
<p>a. Have you completed a cultural resources inventory report prepared by a qualified cultural resources professional? A cultural resources inventory will contain a record search of the California Historical Resources Information System (CHRIS) to determine whether the project area has been previously surveyed and whether cultural resources were identified, along with the results of a sacred lands search from the Native American Heritage Commission (NAHC).</p>	<p><input type="checkbox"/> No. <input type="checkbox"/> Yes. A Cultural Resources Inventory Report is attached. A site-specific cultural resources survey [<input type="checkbox"/> was/<input type="checkbox"/> was not] conducted for this Site. IF "NO" THE BOARD CANNOT ENROLL YOUR SITE UNDER THIS GENERAL ORDER.</p>
<p>b. Have you required that all construction contractors that will perform ground-disturbing activities implement inadvertent discovery measures for cultural resources? Inadvertent discovery measures must include procedures for discovery and protection of cultural resources during construction. Within project areas of identified archaeological sensitivity, discovery</p>	<p><input type="checkbox"/> No. <input type="checkbox"/> Yes. An Inadvertent Discovery Workplan is attached that includes discovery measures that require all construction or ground-disturbing activities be halted within 100 feet of a cultural resources discovery until a qualified professional archaeologist can evaluate the find. If known or suspected human remains are discovered, the County</p>

<p>measures would include: (1) a worker education course for all construction personnel; (2) monitoring of all earth-disturbing activities by a qualified archeologist; and (3) procedures for discovery of cultural resources, including human remains, during construction or ground-disturbing activities if an archaeological monitor is not present.</p>	<p>Coroner will immediately be notified, and if the remains are of Native American origin, the Native American Heritage Commission will be notified within 24 hours. IF "NO" THE BOARD CANNOT ENROLL YOUR SITE UNDER THIS GENERAL ORDER.</p>
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6. Certification: Must be signed by the landowner and cultivator (if different than landowner)

<p>I hereby certify under penalty of perjury, that the information provided in this Notice of Intent accurately represents site conditions, that I will abide by all of the conditions for the General Order category for which I am applying, and that implementation of the Site Management Plan (if Tier 3 cultivator) will assure compliance with all eligibility criteria and conditions.</p>	
<p>Landowner Signature:</p>	<p>Date:</p>
<p>Cultivator Signature:</p>	<p>Date:</p>

¹Percent slope should be determined by measuring between cultivation areas and associated facilities and nearest surface water body

²Cannabis cultivators whose activities occupy and/or disturb less than 1000 square feet do not need to seek coverage under the General Order for Cannabis Cultivation.

³A wetland is an area that is covered by shallow water or where the surface soil is saturated, either year round or during periods of the year; where that water coverage has caused a lack of oxygen in the surface soil; and has either no vegetation or plants of a type that have adapted to shallow water or saturated soil. Some examples are fresh water marshes, bogs, springs, riparian areas, vernal pools, coastal mud flats and salt marshes.

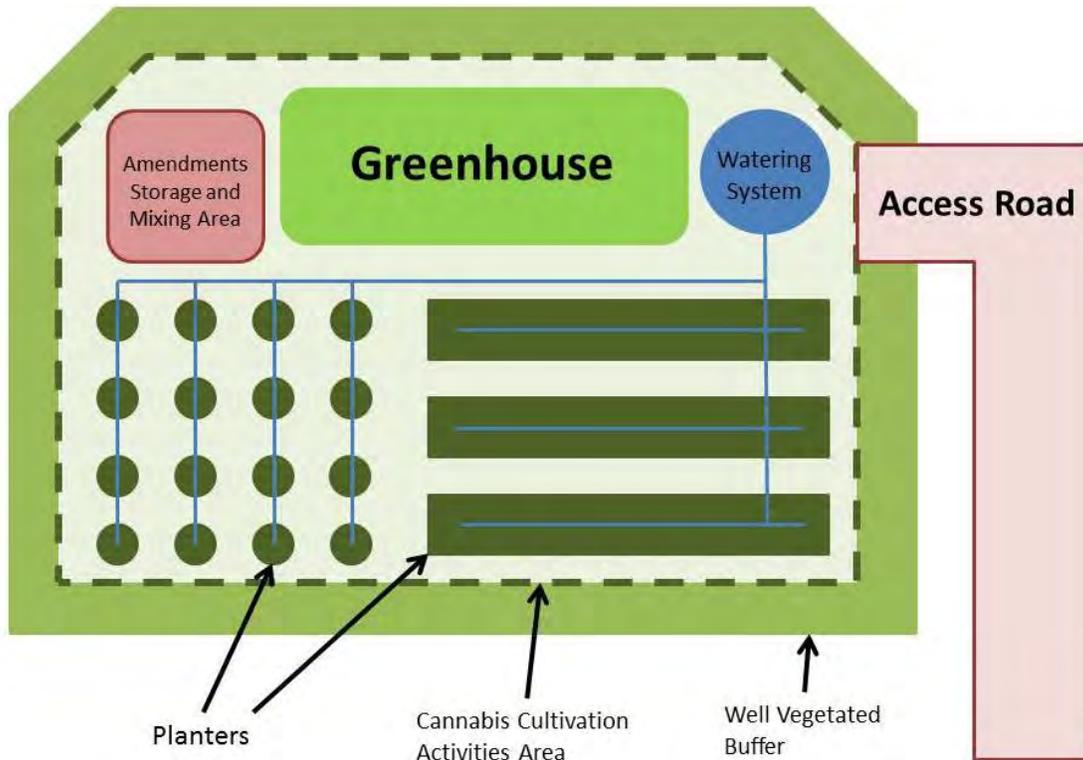
⁴The California Forest Practice Rules define a Class I watercourse as 1) a watercourse providing habitat for fish always or seasonally, and/or 2) providing a domestic water source; a Class II watercourse is 1) a watercourse capable of supporting non-fish aquatic species, or 2) a watercourse within 1000 feet of a watercourse that seasonally or always has fish present.

Site Management Plans for Tier 3 Cultivators

Tier 3 Cultivators must prepare and submit for approval to the Central Valley Water Board a Site Management Plan. The level of detail required in a Site Management Plan will be dependent on the site-specific characteristics of the activity/operation. Plans must be kept available on the site and subject to inspection. Management Plans must address the following:

1. Map of property including areas of operations, roads, water bodies, all cleared/developed areas, and general drainage patterns and directions.
2. Applicable design drawings and schematics for watercourse structures, fish passages, roads, septic tanks, fill prisms, ponds, or any constructed feature that has been designed or engineered.
3. Detailed list with locations of specific management practices to address erosion control/stability, stream crossing construction/maintenance, riparian protection, road construction/maintenance, spoils storage and disposal, irrigation runoff, and water storage and use.
4. List of chemicals stored onsite (fertilizers, pesticides, herbicides, petroleum products, etc...) and information about their frequencies and quantities of use.

Example of what to measure to determine area that cultivation activities and facilities occupy and/or disturb. The area within the dashed line; including planters, watering system, greenhouse, amendments storage and mixing area; would need to be calculated for determining which Tier a Cultivator would fall under.



Attachment C

Annual Monitoring Program Template for Tier 2 and Tier 3 Cultivators

PESTS OF MARIJUANA IN CALIFORNIA

Marijuana pests vary according to cultivar (variety), whether the plants are grown indoors or outdoors, and where the plants are grown geographically. The pests included in this review are preliminary and based on the following sources: a presentation given in 2013 by Whitney Cranshaw, an extension entomologist at Colorado State University, and a review article by John M. McPartland, a professor of family medicine at the University of Vermont. We also received input from Kevin Hoffman, Primary State Entomologist, California Department of Food & Agriculture (CDFA).

HOW TO INTERPRET THE TABLES

Table 1 lists active ingredients not illegal to use on marijuana and the pests that these active ingredients target.

These active ingredients are exempt from **residue tolerance requirements**¹ and either exempt from **registration requirements**² or registered for a use that's broad enough to include use on marijuana. Residue tolerance requirements are set by U.S. EPA for each pesticide on each food crop and is the amount of pesticide residue allowed to remain in or on each treated crop with "reasonable certainty of no harm." Some pesticides are exempted from the tolerance requirement when they're found to be safe. Some of these pesticides are bacterial-based insect pathogens (e.g., *Bacillus thuringiensis*) or biofungicides (e.g., *Bacillus subtilis*, *Gliocladium virens*).

Active ingredients exempt from registration requirements are mostly food-grade essential oils such as peppermint oil or rosemary oil.

Tables 2 and 3 list pests of marijuana grown outdoors and indoors, and **Table 3** shows pests arranged by the portion of the plant they attack. An explanation of the column labels for Tables 2 and 3 follow.

PESTS. The tables show the most likely pests in California based on Cranshaw's presentation and McPartland's list and gleaned from California-based web sites and blogs. Some pests that drew attention on several blogs (e.g., russet mites) may be worse during drought years. Many have cyclic population

fluctuations and others are mainstays of general greenhouse cultivation (e.g., whiteflies, thrips, and fungus gnats). We'll add weeds to this compendium when we have more information.

DAMAGE. For damage caused by greenhouse pests, we derived information from Cranshaw's presentation; for that of outdoor pests when there wasn't any overlap, McPartland's list was used and information from UC IPM for various crops. Accounts of damage by rodents is anecdotal.

PESTS NOT OFFICIALLY IDENTIFIED IN CALIFORNIA. Kevin Hoffman of CDFA notes that several marijuana pests in other states are not yet known in California. These pests would add to the russet mites, aphids, cutworms, budworms, borers, and flea beetles already in California. As more and more marijuana is planted throughout the state, collecting potential pests will enable entomologists to identify new species.

THE IMPORTANCE OF CORRECT IDENTIFICATION. It's essential to identify the potential pest, or you may launch a futile program for a mite or insect that isn't a pest. And likewise, you need to know the correct species or you may use the wrong management strategy. For accurate identification, take specimens to an entomologist.

HOW TO PRESERVE SPECIMENS FOR IDENTIFICATION. If the mite or insect specimen is hard bodied (e.g., beetles, moths) carefully place it in a small pill vial and cushion with crumpled tissue paper. If your specimen isn't yet dead, put it in a jar and place in a freezer overnight. Do not wrap specimens in tissue and seal them in plastic bags or you'll end up with smashed bug parts.

Place soft-bodied specimens (e.g., mites, leafhoppers, aphids, caterpillars) in a jar filled with rubbing alcohol. Include written information such as where on the plant you found the specimen, the general location of the plant, and date captured. Note original color and texture, since these will change once you immerse the specimen in alcohol. Also helpful are photographs of the specimen in its original habitat.

IPM PRACTICES. Most of these are standard practices for pests on hosts other than marijuana. For more detailed explanations, see information compiled by the

¹ 40 CFR (Code of Federal Regulations)

² under FIFRA section 25(b) and 3 CCR section 6147

University of California Statewide IPM Program (UC IPM) at www.ipm.ucdavis.edu. You can enter a pest name in the search box (e.g., cutworm) and read about IPM practices for the pest on crops other than marijuana. For marijuana grown indoors, go to the UC IPM [home page](#), click on [Agricultural Pests](#) and scroll down the alphabetical list until you reach [ornamental nurseries](#).

Some practices were excluded because they apply to nearly all of the pests. For example, when targeting aphids, whiteflies, and thrips, growers can attract predaceous and parasitic arthropods by planting strips or borders of cover crops (e.g., California buckwheat) and insectary plants—especially those in the carrot, mustard, and sunflower families (Pickett & Bugg, 1998).

LEGAL PESTICIDES. These are covered above in the Table 1 description and are exempt from **residue tolerance requirements** and either exempt from

registration requirements or registered for a use that is broad enough to include use on marijuana.

Table 4 shows representative marijuana pests by plant part. Not all of these pests are important, but their collective damage may affect the overall health of the plant.

REFERENCES

- Cranshaw, Whitney. 2013. Challenges and opportunities for pest management of medical marijuana in Colorado. Presentation.
- McPartland, J.M. 1996. *Cannabis* pests. *J. Internatl. Hemp Assoc.* 3(2): 49, 52–55.
- Pickett, C.H. & R.L. Bugg, eds. 1998. *Enhancing Biological Control: Habitat management to promote natural enemies of agricultural pests*. UC Press, Oakland, Calif.

Table 1. Active ingredients that are exempt from residue tolerance requirements^a and either exempt from registration requirements^b or registered for a use broad enough to include use on marijuana.

ACTIVE INGREDIENT	PEST OR DISEASE
azadirachtin ^a	aphids, whiteflies, fungus gnats, leafminers, cutworms
<i>Bacillus subtilis</i> QST ^{a1}	root diseases, powdery mildew
<i>Bacillus thuringiensis</i> ^{a2} subsp. <i>aizawai</i> or <i>kurstaki</i>	moth larvae (e.g., cutworms, budworms, borer)
<i>Bacillus thuringiensis</i> ^{a2} subsp. <i>israelensis</i>	fly larvae (e.g., fungus gnats)
<i>Beauveria bassiana</i> ^{a3}	whiteflies, aphids, thrips
cinnamon oil ^b	whiteflies
<i>Gliocladium virens</i> ^{a1}	root diseases
horticultural oils ^a (petroleum oil)	mites, aphids, whiteflies, thrips; powdery mildew
insecticidal soaps ^a (potassium salts of fatty acids)	aphids, whiteflies, cutworms, budworms
iron phosphate ^a , sodium ferric EDTA ^a	slugs and snails
neem oil ^a	mites; powdery mildew
potassium bicarbonate ^a ; sodium bicarbonate ^a	powdery mildew
predatory nematodes ^a	fungus gnats
rosemary + peppermint essential oils ^b	whiteflies
sulfur ^a	mites, flea beetles
<i>Trichoderma harzianum</i> ^{a1}	root diseases

^a 40 CFR (Code of Federal Regulations)

^b FIFRA §25(b) and 3 CCR §6147 [FIFRA = the Federal Insecticide, Fungicide, and Rodenticide Act; CCR = California Code of Regulations]

¹ Biofungicides

² Bacterial-based insect pathogen

³ Fungal-based insect pathogen

Table 2. PEST MANAGEMENT PRACTICES FOR MARIJUANA GROWN OUTDOORS

PEST		DAMAGE	IPM PRACTICES (monitoring; cultural, physical, mechanical, biological)	PESTICIDES
MITES & INSECTS				
two-spotted spider mites <i>Tetranychus urticae</i> (and other Tetranychidae)		Suck plant sap; stipple leaves	<ul style="list-style-type: none"> ▪ Keep dust down by hosing off plants (if dust is a problem) ▪ Release predatory mites 	neem oil, horticultural oil
russet mites <i>Aculops</i> spp.		Suck plant sap; kill leaves and flowers	<ul style="list-style-type: none"> ▪ Release predatory mites 	neem oil, horticultural oil, sulfur
crickets (field & house)		Eat seedlings	<ul style="list-style-type: none"> ▪ Use floating row covers or cones on individual plants 	—
termites		Eat roots	<ul style="list-style-type: none"> ▪ Flood nests 	—
leafhoppers		Suck plant sap; weaken plants	<ul style="list-style-type: none"> ▪ Encourage natural enemies by planting nectar sources 	horticultural oil or insecticidal soaps for nymphs
aphids <i>Myzus persicae</i> , <i>Aphis fabae</i>		Suck plant sap; weaken plants	<ul style="list-style-type: none"> ▪ Hang up yellow sticky cards (alates) ▪ Hose off plants 	azadirachtin, horticultural oil, insecticidal soaps, <i>Beauveria bassiana</i>
whiteflies <i>Trialeurodes vaporariorum</i> , <i>Bemisia tabaci</i> , <i>B. argentifolii</i>		Suck plant sap; weaken plants	<ul style="list-style-type: none"> ▪ Hang up yellow sticky cards ▪ Use reflective plastic mulch 	azadirachtin, horticultural oil, insecticidal soaps, rosemary + peppermint oils, <i>Beauveria bassiana</i>
leafminers <i>Liriomyza</i> spp.		Bore into roots and leaves	<ul style="list-style-type: none"> ▪ Remove older infested leaves ▪ Use biocontrol: release <i>Diglyphus</i> parasitoids 	azadirachtin
LEPIDOPTERA	cutworms <i>Agrotis ipsilon</i> , <i>Spodoptera exigua</i> (Noctuidae)	Eat seedlings	<ul style="list-style-type: none"> ▪ Use pheromone traps to detect adults. ▪ Remove weeds, which serve as a reservoir for cutworms and other noctuids 	Vegetative stage only: Use <i>Bacillus thuringiensis kurstaki</i> if egg-laying adults found, insecticidal soap; azadirachtin
	budworms <i>Helicoverpa zea</i> (Noctuidae)	Eat flowering buds	<ul style="list-style-type: none"> ▪ Shake plants to dislodge larvae ▪ Remove infested buds ▪ Plant corn as trap crop 	Vegetative stage only: Use <i>Bacillus thuringiensis kurstaki</i> , insecticidal soap

PEST		DAMAGE	IPM PRACTICES (monitoring; cultural, physical, mechanical, biological)	PESTICIDES
COLEOPTERA	flea beetles (Chrysomelidae)	Bore into stems (grubs); feed on seedlings and leaves of larger plants (adults)	<ul style="list-style-type: none"> ▪ Use reflective mulches ▪ Plant trap crops (e.g., radish or Chinese mustard) 	sulfur
	scarab grubs (possibly other beetles)	Bore into stems	<ul style="list-style-type: none"> ▪ Use parasitic nematodes 	—
MAMMALS				
mice (e.g., house mice)		Eat young sprouts and seeds	<ul style="list-style-type: none"> ▪ Double wrap a 3'-tall chicken wire fence around plants ▪ Trap (minus rodenticides) ▪ Mount barn owl boxes 	rodenticides*
roof rats, <i>Rattus rattus</i> wood rats, <i>Neotoma</i> spp.		Strip bark from stems to build nests		
pocket gophers, <i>Thomomys</i> spp.		Tunnel through planting areas; feed on plants; gnaw on irrigation lines		
Columbian black-tailed deer, <i>Odocoileus hemionus</i> <i>columbianus</i>		Knock over plants; leave dander, droppings, and ticks behind	<ul style="list-style-type: none"> ▪ Install deer fencing 	—
black bears, <i>Ursus americana</i>		Knock over plants	<ul style="list-style-type: none"> ▪ Install electric fencing 	—

* If using a rodenticide, use products that are not DPR-restricted materials or federally restricted-use pesticides *and* are registered for a broad enough use to include use in or around marijuana cultivation sites. If using a rodenticide always read and follow the label and check to make sure that the target rodent is listed. Second-generation anticoagulant products (contain the active ingredients brodifacoum, bromadiolone, difenacoum, and difethialone) are DPR-restricted materials not labeled for field use and should never be used in or around marijuana cultivation sites.

Table 3. PEST MANAGEMENT PRACTICES FOR MARIJUANA GROWN INDOORS
(e.g., greenhouses, sheds, and grow rooms)

PEST	DAMAGE	IPM PRACTICES (monitoring; cultural, physical, mechanical, biological)	PESTICIDES
DISEASES			
powdery mildew <i>Sphaerotheca macularis</i>	Grow on leaves as white and gray powdery patches	<ul style="list-style-type: none"> Use fans to improve air circulation 	horticultural oil; neem oil; sodium bicarbonate, potassium bicarbonate; <i>Bacillus subtilis</i>
pythium root rots <i>Pythium</i> spp.	Attack root tips and worsens when plants grow in wet soil	<ul style="list-style-type: none"> Avoid hydroponic production or wet soil conditions 	Incorporate biocontrol agents into root-growing media (e.g., <i>Gliocladium virens</i> , <i>Trichoderma harzianum</i> , <i>Bacillus subtilis</i>)
MITES & INSECTS			
two-spotted spider mite <i>Tetranychus urticae</i> (and other Tetranychidae)	Suck plant sap; stipple leaves	<ul style="list-style-type: none"> Disinfest cuttings before introducing to growing area Release predatory mites 	neem oil, horticultural oil, sulfur
leafhoppers	Suck plant sap; weaken plants	<ul style="list-style-type: none"> Encourage natural enemies by planting nectar sources 	horticultural oil or insecticidal soaps for nymphs
whiteflies <i>Trialeurodes vaporariorum</i> , <i>Bemisia tabaci</i> , <i>B. argentifolii</i>	Suck plant sap; weaken plants	<ul style="list-style-type: none"> Hang up yellow sticky cards Use biocontrol: <i>Encarsia formosa</i> 	azadirachtin, <i>Beauveria bassiana</i> , cinnamon oil, horticultural oil
thrips <i>Heliethrips haemorrhoidalis</i> , <i>Frankliniella occidentalis</i> , <i>Thrips tabaci</i>	Stipple leaves and vector viruses	<ul style="list-style-type: none"> Hang up yellow or blue sticky cards 	
dark-winged fungus gnats (Diptera: Sciaridae) <i>Bradysia</i> spp.	Damage roots and stunt plant growth	<ul style="list-style-type: none"> Avoid overwatering Use growing media that deters gnat development Hang up yellow sticky cards Use biocontrol: soil-dwelling predatory mites 	<i>Bacillus thuringiensis israelensis</i> (BTI); predatory nematodes; azadirachtin soil drenches

Table 4. PESTS OF MARIJUANA BY PLANT PART

Seedlings	Flower & Leaf (grown outdoors)	Flower & Leaf (grown indoors)	Stalk & Stem	Root
crickets	flea beetles	spider mites	rats	flea beetles
cutworms	leafminers	leafhoppers		white root grubs
flea beetles	budworms	aphids		root maggots
slugs		whiteflies		termites & ants
rodents		thrips		fungus gnats
birds				wireworms