

**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](mailto: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](http://www.waterboards.ca.gov/centralvalley)

[www.waterboards.ca.gov/centralvalley/water\\_issues/marijuana/index.shtml](http://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](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.pdf](http://agwaterstewards.org/images/uploads/docs/1213661598_Water_Storage_Guide.pdf)<sup>1</sup>

## 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.

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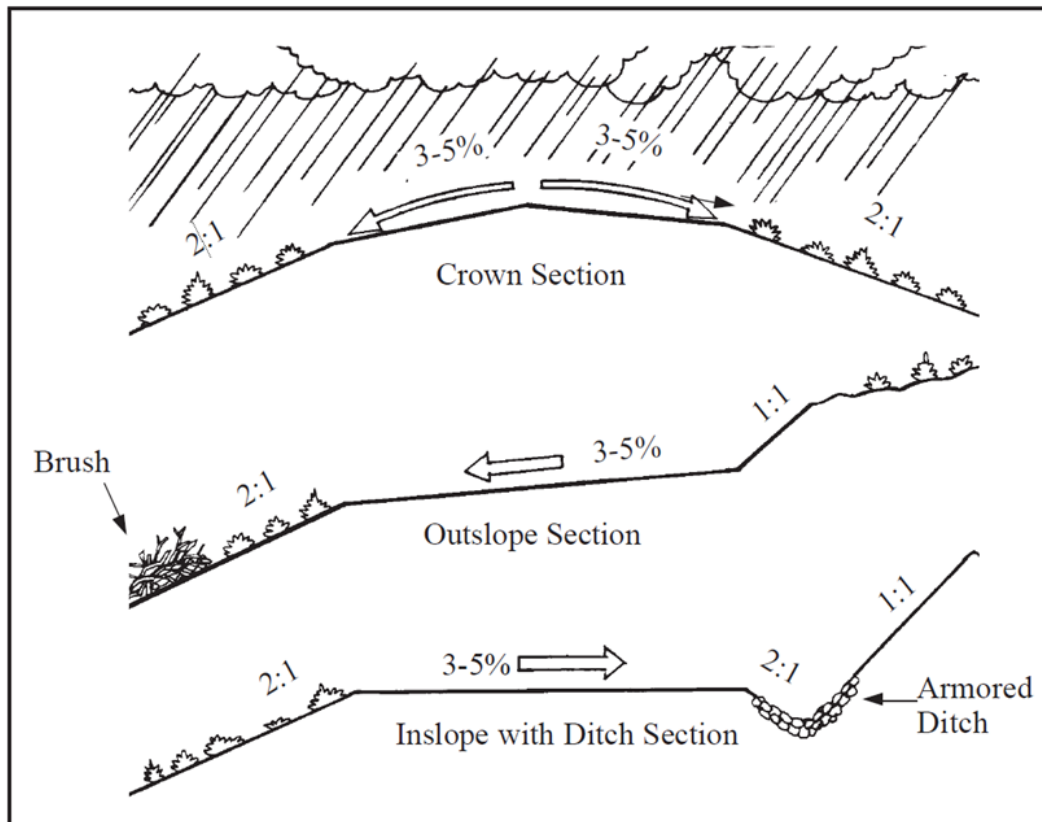
<sup>1</sup> The Central Valley Water Board provides cite to third party documents for informational purposes only and does not necessarily endorse or approve all the information contained therein. It is important to note that persons who are diverting surface flows to water storage for later use must 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

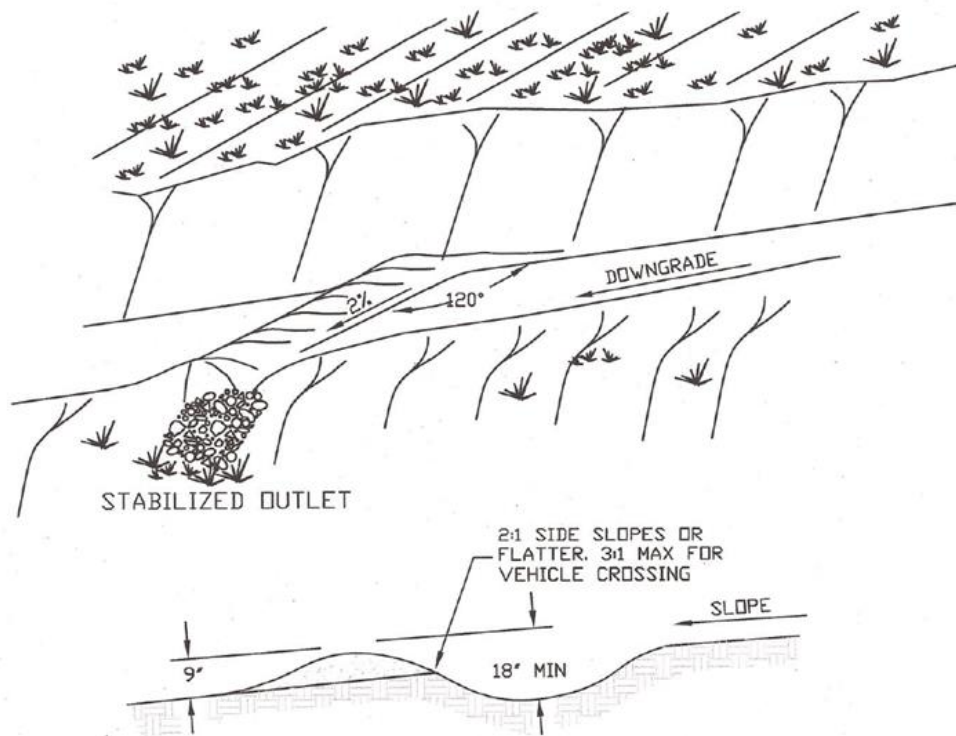
- New roads should be planned and designed to stay as far away from watercourses as possible and to minimize the number of watercourse crossings.
- Decommission or relocate existing roads away from riparian zones whenever possible.

- 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.



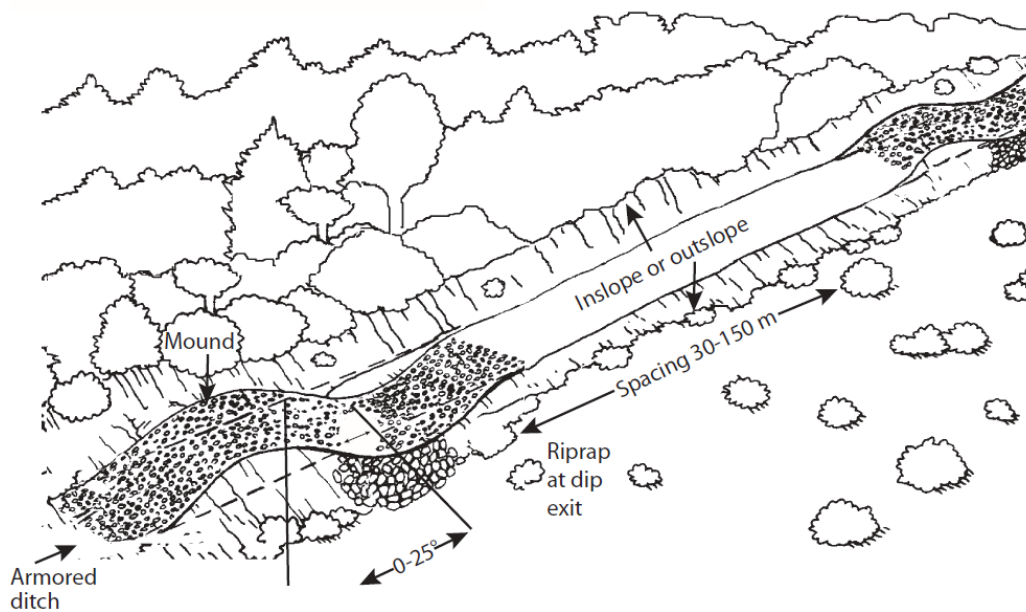
Cross sectional views of typical road drainage options

Image from Keller and Sherar 2003



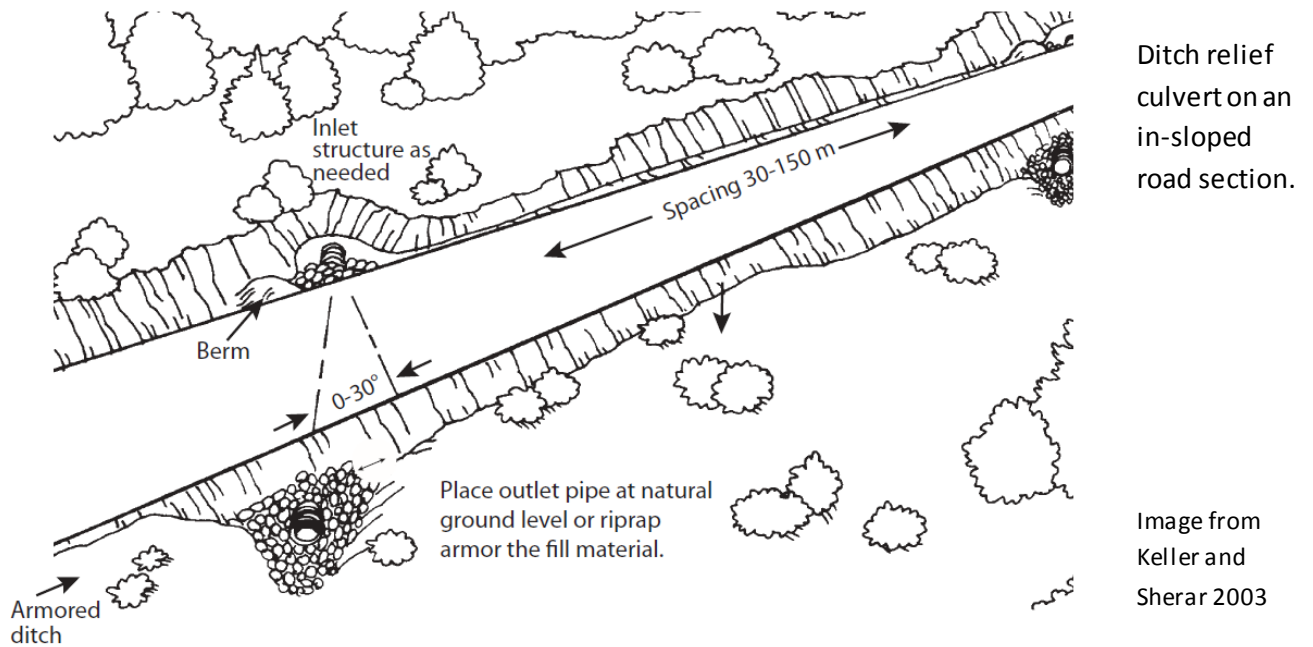
Construct water bars and/or rolling dips no more than 150 feet apart or 100-50 feet apart on steeper slopes and/or when road surface is easily erodible.

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



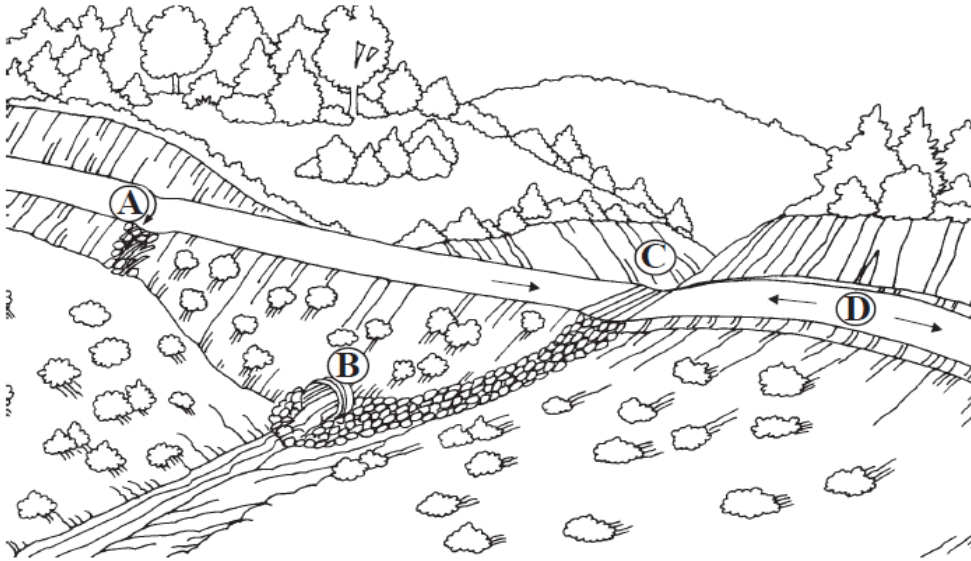
Rolling dip on an out-sloped road. Proportions exaggerated for clarity.

Image from Keller and Sherar 2003



- 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](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](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>

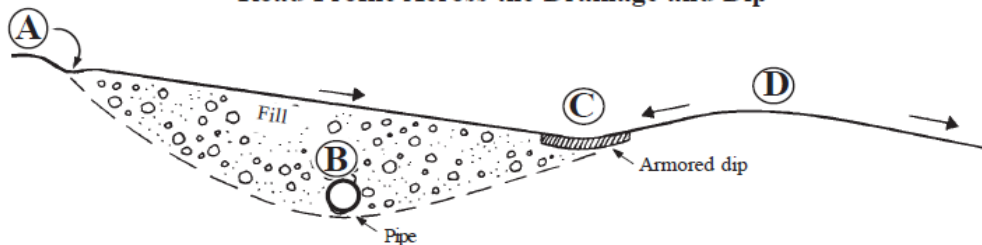
### Culvert Installed with Protection using an Armored Overflow Dip to Prevent Washout and Fill Failure



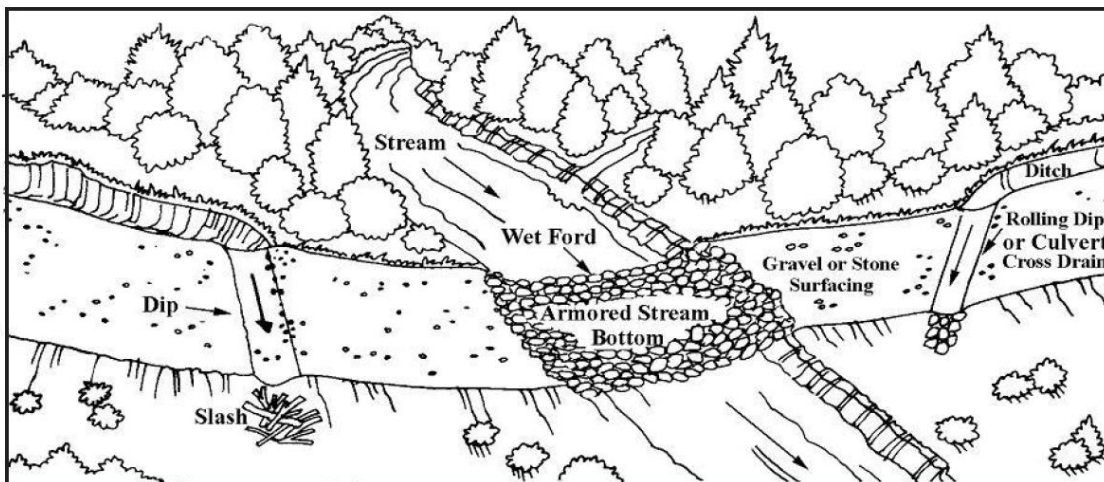
- (A) Roadway Cross Drain (Dip)
- (B) Culvert
- (C) Overflow Protection Dip
- (D) High point in the road profile

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.

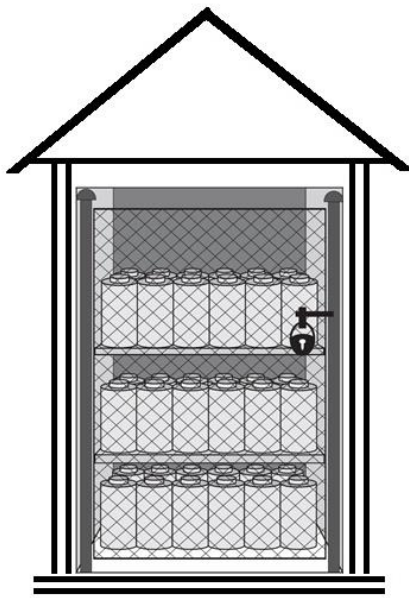
\*At present time, there are no pesticides registered specifically for use on cannabis, and the use of pesticides on cannabis plants has not been reviewed for safety, human health effects, or environmental impacts. Under California law, the only pesticide products not illegal to use on cannabis are those 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

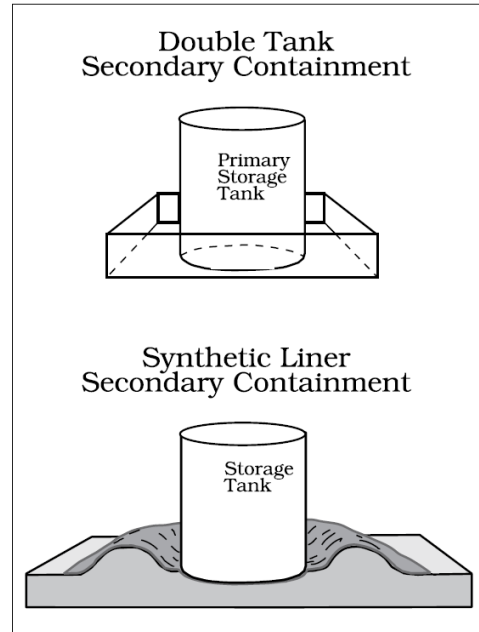
- Pesticides and fertilizers should be kept in their original containers and the containers should be stored in a building, to prevent exposure to sunlight and precipitation, with secondary containment in the case of leaks or spills.
- Separate storage areas should be established so that pesticides, 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 <sup>th</sup> 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 <sup>th</sup> 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 <sup>nd</sup> 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 <sup>th</sup> 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 <sup>th</sup> Street, Suite 123 Marysville, CA 95901	Phone: (530) 749-5430 Fax: (530) 749-5434
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### **County Agriculture Commissioners**

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

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

<b>Type of Licensed Professional</b>	<b>CA Professional License Title</b>	<b>Typical areas of expertise and project work</b>
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.