Final 2024 Staff Report and Recommendations on Agricultural Burning

November 14, 2024

San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT®

SAN JOAQUIN VALLEY
AIR POLLUTION CONTROL DISTRICT

Final 2024 Staff Report and Recommendations on Agricultural Burning

November 14, 2024

Prepared by:

Celina Chavez, Air Quality Specialist

Contributors:

Crystal Yunker, Supervising Air Quality Specialist

Reviewed by:

Aaron Tarango, Program Manager
Emily Kneeland, Director of Air Quality Planning
John Stagnaro, Director of Compliance
Jonathan Klassen, Director of Air Quality Science
Todd DeYoung, Director of Strategy and Incentives
Sheraz Gill, Deputy Air Pollution Control Officer

TABLE OF CONTENTS

1 Executive Summary

The San Joaquin Valley (Valley) boasts the world's most productive farmland, cultivating over 250 crop types from over 4.5 million acres of cropland. Historically, the practice for disposing of agricultural waste materials such as prunings and orchard removals has been through the open burning of the materials in the field. Burning agricultural materials has provided a feasible method for the timely disposal of these materials, helping to prevent the spread of plant diseases, and controlling weeds and pests. The San Joaquin Valley Air Pollution Control District (District), California Air Resources Board (CARB), and Valley growers have implemented a number of measures to reduce open burning emissions and minimize the impact on the Valley over the years.

The Valley, in adherence with applicable state laws instituted under Senate Bill (SB) 705 (Florez 2003), has the toughest restrictions on agricultural burning in the nation. District requirements, implemented through District Rule 4103 (Open Burning), no longer allow the burning of field crops, prunings, vineyards, and orchard removals with the exception of minimal crop types and materials that have disease and other feasibility issues. The District also operates a comprehensive Smoke Management System (SMS), which ensures that the open burning of any remaining agricultural materials does not cause or contribute to exceedances of federal air quality standards, cause a public nuisance, or impact nearby smoke-sensitive areas. These requirements are enforced through permits, project inspections, proactive surveillance, and complaint response.

Per the requirements in Rule 4103, every five years the District must review and make recommendations on agricultural burning in the Valley. Accordingly, the District has successfully implemented a near-complete phase-out of agricultural burning for the majority of crop types. Most recently, on December 17, 2020, the District prepared the *2020 Staff Report and Recommendations on Agricultural Burning* (*2020 Report*),[1] which re-evaluated strategies to eliminate agricultural managed burning where feasible, including new prohibitions on open burning reliant on newly emergent alternatives, a call for federal, state and local incentive funding to assist with widespread transition to costly new alternatives, and partnerships with agricultural stakeholders, CARB, and the U.S. Department of Agriculture – Natural Resource Conservation Service (USDA-NRCS) to assist with the final stages of development of feasible alternatives.

On February 5, 2021, CARB staff published their recommendations[2] regarding the District's *2020 Report*, and on February 25, 2021, CARB approved their staff's recommendations. This CARB action included full short-term concurrence with the

[1] SJVAPCD. *2020 Staff Report and Recommendations on Agricultural Burning.* (December 17, 2020). Retrieved from: https://ww2.valleyair.org/media/wjgk2hzi/2020-ag-burn-report.pdf

[2] CARB. Staff Recommendations, San Joaquin Valley Agricultural Burning Assessment. (February 5, 2021). Retrieved from: https://ww2.valleyair.org/media/io4aak2w/2021-carb-staff_recommendations_sjv_ag_burn.pdf

District's *2020 Report* and recommendations through August 31, 2021, longer-term concurrence with many of the District's *2020 Report* recommendations through 2025, and additional criteria for longer-term concurrence beyond August 31, 2021, including a timeline for the near-complete phase-out of open burning for the majority of remaining crop categories by January 1, 2025 (with some exceptions such as diseased crops). Additionally, in supporting their concurrence action, CARB highlighted and affirmed the critical role that the state plays in securing needed state incentive funding to support the transition, and addressing barriers to the establishment of new bioenergy solutions.

CARB committed to partner with the District on several measures to help increase the ability of the agricultural industry to comply with these mandates. Additionally, CARB identified the need for a period of transition to continue addressing the economic feasibility of alternatives to open burning and develop additional State and Federal funding commitments for alternative methods of disposal, and provided concurrence with the District's determinations under California Health and Safety Code (CH&SC) Section (§) 41855.6 for burn prohibition postponements, as set forth in the *2020 Report*, through August 31, 2021.

On June 17, 2021, the District Governing Board took action to approve the *Supplemental Report and Recommendations on Agricultural Burning* (*2021 Supplemental Report*),[3] which established updated requirements for the near-complete phase-out of remaining agricultural open burning in the Valley by January 1, 2025. This action was supported by an extensive public process, and CARB approved the adopted strategy on June 18, 2021, and provided concurrence through December 31, 2024.[4] On June 16, 2022, EPA took final action to approve the accelerated phase-out schedule detailed in the *2021 Supplemental Report* and determined that it complied with the relevant Clean Air Act (CAA) requirements.[5]

In accordance with CARB's five-year concurrence and requirements set forth in Rule 4103, the District is again evaluating the economic and technological feasibility of removing the very limited postponement of burning prohibitions for certain crop categories. District staff are actively working with agricultural industry stakeholders, CARB, USDA-NRCS, and other partners to identify and promote alternatives to open burning in the Valley. This *2024 Staff Report and Recommendations on Agricultural Burning* (*2024 Report*) provides staff recommendations on the feasibility of further potential prohibitions on agricultural burning in the Valley.

---

[3] SJVAPCD. *Supplemental Report and Recommendations on Agricultural Burning.* (June 17, 2020). Retrieved from: https://ww2.valleyair.org/media/aldmsd0b/final-supplemental-report-and-recommendations-on-agricultural-burning.pdf

[4] CARB. *2021 CARB Concurrence Letter*. (June 18, 2021). Retrieved from: https://ww2.valleyair.org/media/5lan5hsx/jun-2021-sjv-ag-burn-concurrence-letter_final.pdf

[5] EPA. *Air Plan Approval; California; San Joaquin Valley Unified Air Pollution Control District.* 87 FR 36222. (June 16, 2021). Retrieved from: https://www.federalregister.gov/documents/2022/06/16/2022-12387/air-plan-approval-california-san-joaquin-valley-unified-air-pollution-control-district-open-burning

1.1 Efforts to Reduce Agricultural Managed Burning in the San Joaquin Valley

Over the past two decades, concerted efforts with the agricultural community have led to significant reductions in emissions from agricultural burning. As of January 1, 2024, the final stage of the phase-out schedule for vineyard removals, small orchard removals, and surface harvested prunings are now in effect, including the prohibition of raisin tray burning. Following the near-complete phase-out of open agricultural burning in 2025, the District will continue to allow burning of limited amounts of rice straw (which has the potential for risk of disease), diseased crops and materials, weeds affecting ponding and levee banks, and weeds and other maintenance, as defined by Rule 4103.

State law, as codified in CH&SC §§ 41855.5 and 41855.6, and incorporated into Rule 4103, outlined a phased-in approach to the prohibitions that are only applicable to the Valley. Through multiple actions, the Governing Board has continued to prohibit agricultural open burning where feasible, as outlined in the CH&SC. The history of the District's actions to phase-out agricultural burning for specific crop types is summarized below.

Table 1 Agricultural Materials Prohibited from Open Burning

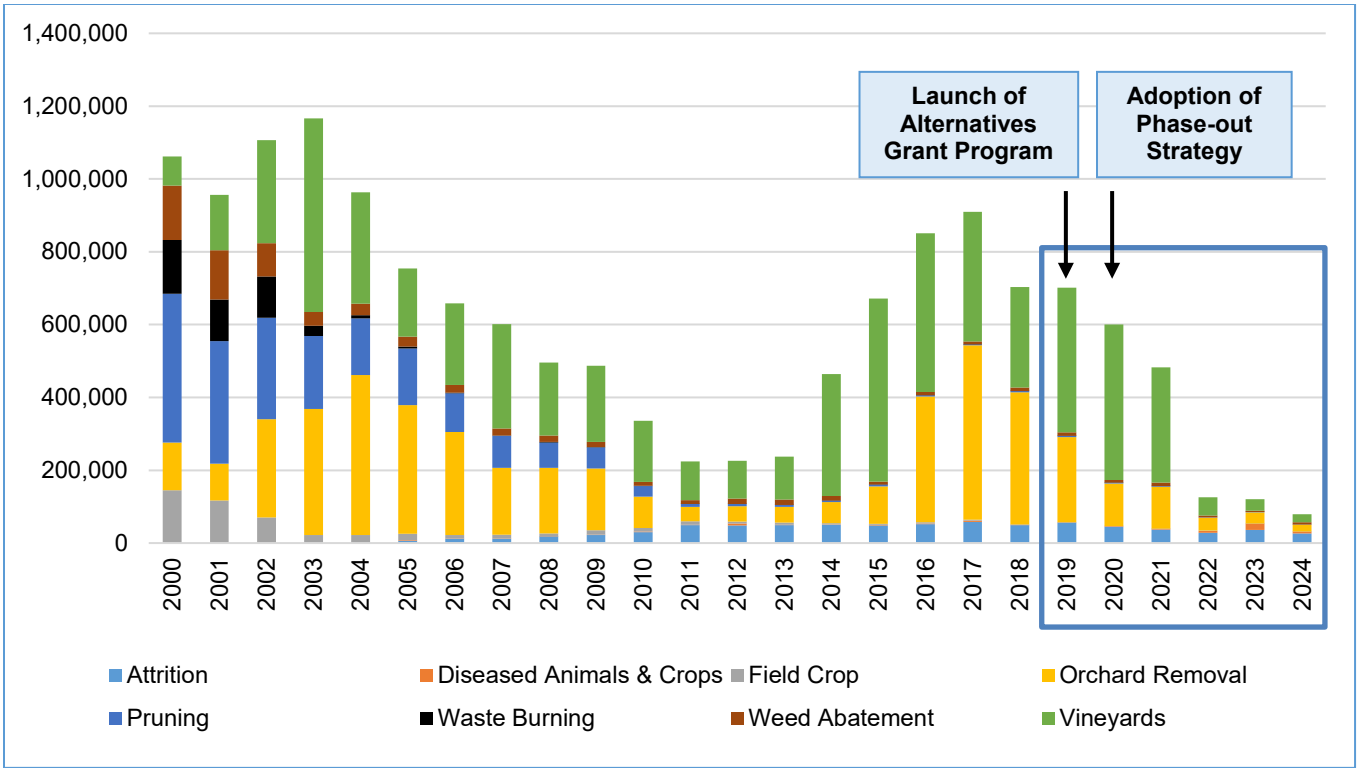
Date	Crop Category	Agricultural Material Prohibited from Open Burning
2005	**Field Crops**	Alfalfa, asparagus, barley stubble, beans, corn, cotton, flower straw, hay, lemon grass, oat stubble, pea vines, peanuts, safflower, sugar cane, vegetable crops, and wheat stubble
	Field Crops	Rice stubble: No more than 70% of operator's acreage can be burned
	Prunings	Apricot crops, avocado crops, bushberry crops, cherry crops, Christmas trees, citrus crops, date crops, eucalyptus crops, kiwi crops, nectarine crops, nursery prunings, olive crops, pasture or corral trees, peach crops, persimmon crops, pistachio crops, plum crops, pluot crops, pomegranate crops, prune crops, and rose crops
	Weed Abatement	Berms, fence rows, pasture, grass, and Bermuda grass
2007	**Field Crops**	Rice stubble: No more than 50% of the operator's acreage can be burned
	Orchard Removals	Orchard removal matter for all crops with the exception of citrus, apple, pears, quince, and fig crops, and from 20 acres or less at a single location
2010	**Orchard Removal Matter**	Small orchards: Reduced burn allowance to 15 acres or less per location per year (includes fig crops)
	Other Materials	Brooder paper, deceased goats
	Field Crops	Rice stubble: Modified schedule to phase-out by June 2015
	Prunings	Fig crops
	Surface Harvested Prunings	Almond, walnut, and pecan: Prohibit burning for each ag operation whose total nut acreage at all sites is 3,500 acres or more (allows burning of up to 20 acres per year for ag operations whose total nut

Date	Crop Category	Agricultural Material Prohibited from Open Burning
		acreage at all sites is less than 3,500 acres with a case-by-case allowance of additional burn requests based on economic feasibility); grape canes (defined as "vineyard materials) and grape vines
2012	**Orchard Removals**	Citrus orchard removals at agricultural operations whose total citrus acreage at all agricultural operation sites is ≥ 3,500 acres; and citrus orchard removals greater than 15 acres at agricultural operations whose total citrus acreage at all agricultural operation sites is < 3,500 acres and an alternative is feasible through a case-by-case determination
2020	**Surface Harvested Prunings**	Raisin trays, phase-out by 2024
	Field Crops	Residual rice stubble and spot burning, phase-out by 2021
2021	**Vineyard Removals**	All vineyard removal open burns, phase-out by 2025
	Orchard Removals	All orchard removal open burns, phase-out by 2025
	Surface Harvested Prunings	Almond, walnut, and pecan crops open burns, phase-out by 2025
	Field Crops	Rice straw: prohibit open burning of 80% of rice straw per year of the total acreage of rice farmed

Through the initial implementation of the final phase-out strategy in 2020 and continuing through 2024, the amount of agricultural material being open burned through the District's Smoke Management System (SMS) process has continued to decrease. Additionally, reducing emissions from agricultural burning is important to the District's attainment efforts for the PM2.5 and ozone standards.

As illustrated in the below figure, the amount of agricultural material open burned in 2022 was approximately 125,000 tons, significantly less than the previous year total of 480,000 tons burned in 2021, and over 1,000,000 tons burned per year historically. Continuing this decreasing trend, the total amount of material burned in 2023 was approximately 122,000 tons, less than the 2022 total, and again setting a new record low for the Valley. In addition, the total tons of material burned in 2024 to date continue this declining trend, demonstrating the effectiveness of the phase-out strategy. Notably, the significant reductions in tonnage burned have far surpassed the projected agricultural burning tonnage estimated as part of the *2021 Supplemental Report*.

Figure 1 Trend of Agricultural Burning Activity



** 2024 value represents tons burned to date*

The District's Governing Board has continued to prioritize measures to identify, develop, and deploy new alternatives to agricultural open burning. Since the Governing Board's adoption of the program in 2018, the District initially allocated over $25 million in local District funding towards the *Ag Burn Alternatives Grant Program*. In 2021, the District also received $178 million in state funding towards the *Ag Burn Alternatives Grant Program*, of which $30,000,000 was used to expand fleet capacity for chipping contractors in the Valley to accommodate the increased demand for these services. Over the years of 2022 and 2023, the amount of material that has been processed through the *Ag Burn Alternatives Grant Program* has been in excess of 2,000,000 tons of material each year, significantly contributing to the reduction in agricultural open burning in the Valley. The reductions in agricultural open burning and use of alternatives mark record levels for the Valley since the institution of agricultural burning restrictions, highlighting the early success of the ongoing phase-out strategy as well as the success of the *Ag Burn Alternatives Grant Program*.

As highlighted above, the District's agricultural open burning phase-out strategy, along with the *Ag Burn Alternatives Grant Program*, are working effectively. New alternatives to open burning have emerged and are being implemented, and Valley growers are utilizing the incentive program at a high rate. As the final phase-out of agricultural burning is implemented in 2025, incentives continue to play an essential role in order to provide cost-effective alternatives to agricultural burning. Towards that end, the District

has continued to collaborate with the agricultural sector, CARB, USDA-NRCS, and Valley stakeholders, and has pursued a number of initiatives to develop new alternatives to managed burning, including legislative energy policy enhancements, development of registration mechanisms for air curtain burners, supporting new bioenergy projects that utilize agricultural woody materials, and development of incentive measures to promote the development and demonstration of new alternatives.

1.2 2024 Staff Report and Recommendations on Agricultural Burning

As required under Rule 4103 and consistent with CH&SC §§ 41855.5 and 41855.6, this *2024 Report* is the District's latest evaluation of agricultural open burning and consideration of any additional prohibitions and postponements since the District's most recent evaluation and CARB concurrence in 2021.

Table 2 2024 Report Recommendations

Crop Category	Prohibited Crops	2024 Report Recommendations	Findings
Field Crops	Continue to prohibit alfalfa, asparagus, barley stubble, beans, corn, cotton, flower straw, hay, lemon grass, oat stubble, pea vines, peanuts, safflower, sugar cane, vegetable crops, wheat stubble, and residual rice stubble and spot burning.	Continue postponed prohibition of burning of weeds and vegetative materials on rice field levees and banks	No feasible alternative as mowing and herbicides are not viable alternatives due to slopes and water contamination issues
		Continue to prohibit open burning of 80 percent of rice straw per year of the total acreage of rice farmed by the operator	Remaining postponement due to disease issues, and aligns prohibitions with state law for Sacramento Valley
Prunings	Continue to prohibit apricot crops, avocado crops, bushberry crops, cherry crops, Christmas trees, citrus crops, date crops, eucalyptus crops, kiwi crops, nectarine crops, nursery prunings, olive crops, pasture or corral trees, peach crops, persimmon crops, pistachio crops, plum crops, pluot crops, pomegranate crops, prune crops, rose crops, and fig crops	Continue postponed prohibition of burning of apple, pear, and quince crop prunings	No technologically feasible alternative due to fire blight (contagious disease)
Weed Abatement	Continue to prohibit berms, fence rows, pasture, grass, and bermuda grass	Continue postponed prohibition of weed abatement burning affecting ponding and levee banks	No feasible alternative as mowing and herbicides are not viable alternatives due to slopes and water contamination issues
Orchard Removals	Effective January 1, 2025, prohibit all orchard removal open burns	Continue postponed prohibition of burning apple, pear, and quince orchard removals	No technologically feasible alternative due to fire blight (contagious disease)

Crop Category	Prohibited Crops	2024 Report Recommendations	Findings
Other Materials	Continue to prohibit brooder paper and deceased goats	Continue postponed prohibition of burning of diseased beehives	No technologically feasible alternative due to disease issues

Based on the analysis presented in this *2024 Report*, consistent with District Rule 4103, Section 5.2.2, the District recommends the continued postponement of the crop categories listed in Table 2. The District will continue to evaluate these categories as required under Rule 4103. Additionally, the District will continue to carefully manage all remaining agricultural burning with its Smoke Management System (SMS) to ensure that managed burning does not cause a public nuisance, impact smoke sensitive areas, or create or contribute to an exceedance of an ambient air quality standard. Per District Rule 4103 requirements, the District is requesting CARB concurrence and EPA review on the *2024 Report*.

2 Regulatory Background

2.1 California Health and Safety Code Burning Prohibitions

In 2003, California SB 705, incorporated into CH&SC §§ 41855.5 and 41855.6, requires the District to regulate the burning of diseased crops, establish best management practices (BMP) for the maintenance and control of weeds, and phase-out the open burning for numerous crop categories. SB 705 established a schedule for specific types of agricultural material to no longer be burned in the field, but provided for a postponement of the phase-out where justified by technical and economic impediments. The District has implemented SB 705 through Rule 4103 and the District's Smoke Management Program.

Under CH&SC §§ 41855.5 and 41855.6, open burning for agricultural crop categories is required to be phased-out under a prescribed schedule, unless certain findings are made with respect to the availability of funding and economically feasible alternatives to open burning. These findings include:

1. There is no economically feasible alternative means of eliminating waste.
2. There is no long-term federal or state funding commitment for continued operation of biomass facilities in the Valley or development of alternatives to burning.
3. Continued issuance of permits for that specific category or crop will not cause, or substantially contribute to, a violation of an applicable federal ambient air quality standard.
4. CARB concurs with the District's determinations.

The following table summarizes the requirements for specific categories of agricultural material and their corresponding prohibition dates under state law.

Table 3 Timeline for SB 705-Specific Crop Category Requirements

Effective Date	Category of Agricultural Material
June 1, 2005	Prohibit burning for Field Crops, Prunings, and Weed Abatement
	Establish BMP for Other Weeds and Maintenance
	Regulate burning of diseased crops
June 1, 2007	Prohibit burning for Orchard Removals
June 1, 2010	Prohibit burning for Vineyard Removals, Prunings from Surface Harvested Crops and Other Materials

2.2 District Rule 4103 (Open Burning)

Rule 4103 was first adopted on June 18, 1992, to permit, regulate, and coordinate the use of open burning while minimizing smoke impacts on the public. Rule 4103 has subsequently been amended numerous times to incorporate state law requirements. The provisions of Rule 4103 apply to open burning conducted in the Valley; this rule is

not applicable to prescribed and hazard reduction burning, as defined and regulated by District Rule 4106 (Prescribed Burning and Hazard Reduction Burning).

Rule 4103 provides for the Air Pollution Control Officer (APCO) to restrict and allocate burning based on meteorology and the predicted smoke production. Rule 4103 prohibits issuing permits for the burning of field crops, prunings, weed abatements, orchard removals, vineyard removal materials, surface harvest prunings, and other materials described in the rule. Rule 4103 contains requirements for collecting, sorting, drying, and igniting agricultural materials; the timing, monitoring, and maintenance of burns; and specific requirements for field crop burning, ditch bank and levee maintenance, contraband materials, Russian thistle (tumbleweeds), and diseased materials.

In September 2004, the Governing Board amended Rule 4103 to include specific requirements that must be met for the burning of diseased crops. In May 2005, the rule was further amended to include best management practices for the control of other weeds and maintenance, as well as eliminate burning of waste from field crops, some types of orchard prunings, and weed abatement operations. These amendments implemented the burn prohibition for 90% of the crops identified in those categories. The May 2007 amendments to the rule further prohibited open burning of orchard removals, except for citrus crops, pome fruit crops (apple, pear, and quince), fig crops, and any other orchard removal that is less than 20 acres. The most recent amendment in April 2010, further prohibited open burning of brooder paper, deceased goats, grape canes, prunings of grape vines and fig crops, and orchard removals of greater than 15 acres, excluding citrus crops and pome fruit crops.

In 2010, the District prepared the *2010 Final Staff Report and Recommendations on Agricultural Burning* (*2010 Report*), which evaluated each crop category identified in CH&SC § 41855.5 and provided recommendations for allowing or prohibiting the open burning of categories as outlined by CH&SC. Based upon the 2010 Report, CARB provided a two-year concurrence on the District's recommended remaining postponements, based on the lack of feasible alternatives to open burning. Additionally, Rule 4103 was amended in 2010 to incorporate the provisions of CH&SC §41855.5 and §41855.6 directly into the rule to more efficiently allow the District to consider the feasibility of non-burning alternatives for specific crops and materials. Rule 4103 requires that, at least every five years, the District prepare a report and recommendations for any Governing Board determinations made pursuant to Section 5.5.2, which is to be presented to the Governing Board for review and approval, and subsequent CARB concurrence as appropriate. The Governing Board-approved report shall be submitted to CARB and EPA for inclusion into the State Implementation Plan.

Based on the District's ongoing evaluations and CARB concurrence, the table below summarizes the crop categories that are prohibited from open burning under Rule 4103:

Table 4 Prohibited Crop Categories under Rule 4103

Crop Category	Specific Crop Types Not Allowed to Open Burn
Field Crops	Alfalfa, asparagus, barley stubble, beans, corn, cotton, flower straw, hay, lemon grass, oat stubble, pea vines, peanuts, safflower, sugar cane, vegetable crops, and wheat stubble
	Residual rice stubble and spot burning
	Prohibit open burning of 80% of rice straw per year of the total acreage of rice farmed
Prunings	Apricot crops, avocado crops, bushberry crops, cherry crops, Christmas trees, citrus crops, date crops, eucalyptus crops, kiwi crops, nectarine crops, nursery prunings, olive crops, pasture or corral trees, peach crops, persimmon crops, pistachio crops, plum crops, pluot crops, pomegranate crops, prune crops, rose crops, and fig crops
Weed Abatement	Berms, fence rows, pasture, grass, and Bermuda grass
Vineyard Removals	Effective January 1, 2025, prohibit all vineyard removal open burns
Orchard Removals	Effective January 1, 2025, prohibit all orchard removal open burns
Surface Harvested Prunings	Grape canes and grape vines
	Effective January 1, 2025, prohibit all surface harvested pruning open burns of almond, walnut, and pecan crops
	Raisin trays
Other Materials	Brooder paper and deceased goats

2.3 District Smoke Management System

In 2004, the District developed the first of its kind Smoke Management System (SMS), a refined method of authorizing or prohibiting individual open burns based on modeling the air quality impacts of smoke. The program is managed by the District's Compliance Department, enforcing strict guidelines to effectively limit burning. The entity requesting a burn permit must first provide the District with the acres and type of agricultural material, and the specific location of the material requested to burn. This information is entered into the SMS, where acres are converted to tons of fuel burned using a fuel loading factor based on the specific crop to be burned. Emissions are calculated by multiplying the tons of fuel burned by a crop-specific emission factor. A burn request may be authorized after analysis and review from the compliance staff, and only if sufficient emissions have been allocated to the burn zone. Open burning has only been permitted under the District's comprehensive SMS, which uses real-time meteorological

information to analyze the impact of burning on air quality and appropriately limit burn allocations by area.

Each year, windows for growers to open burn have continued to become smaller, particularly with respect to longer summer/fall wildfire seasons in recent years, and increasingly stringent residential wood burning requirements. During the winter season from November through February each year, agricultural open burning is strictly prohibited if there are any residential wood burning episodic curtailments under District Rule 4901 (Wood Burning Fireplaces and Wood Burning Heaters). These Rule 4901 curtailments are becoming increasingly frequent, with the majority of winter days now declared as No Burn days for residential wood burning, resulting in fewer agricultural open burn days each winter. The reduction of agricultural open burn days is aligned with the increasing number of Rule 4901 curtailments.

Under the District's SMS program, the Valley is divided into 97 zones. The allocation zones are based on a number of criteria such as crop distribution throughout the Valley, historical burning activities, nearby sensitive receptors, and known geographic boundaries. The amount of burning allowed in a given zone on a specific day is based on factors such as the local meteorology, the air quality conditions, the atmospheric holding capacity, the amount of burning already approved or happening in a given area, and the potential impacts on downwind populations.

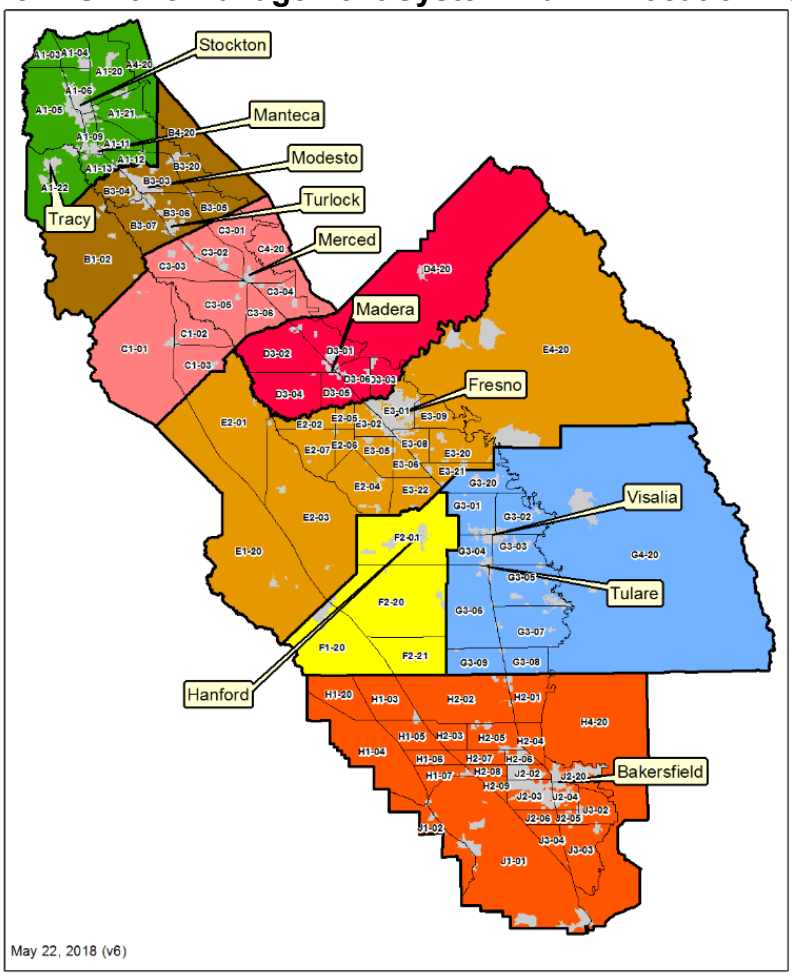
Through the SMS, permit holders submit requests to burn. All requests are subject to an on-site inspection by District field staff prior to being granted a daily burn authorization. This is to ensure only material identified on a burn permit are burned, no foreign material or trash is mixed within the material, and drying time requirements have been met. The surrounding location is also surveilled to determine if any sensitive receptors could be impacted by the burn. Additional restrictions to minimize or eliminate smoke impacts can be added to the burn permit if necessary. In addition to the District’s robust SMS process, the District responds to complaints reported by Valley stakeholders. Investigation of complaints that are currently active takes precedence over all other assigned activities for enforcement staff. After business hours, the District has an automated, bilingual complaint hotline for members of the public to report complaints. These complaints are immediately directed to on-call inspectors who are available 24 hours per day, 7 days a week, to respond to complaints and will address reporting parties’ concerns and abate potential non-compliance in an effort to protect public health.

Through the SMS, the District calculates the emissions from burn requests and compares them against the established emissions allocation for that zone. If there is available allocation and all regulatory requirements have been met, the authorization is approved, otherwise burn requests are placed on a waiting list for when emissions are allocated for the applicable burn zone in the future. In order to avoid exceeding or contributing to exceedances of federal air quality standards, the District must reduce and balance the impacts of agricultural burning, wildfires, and prescribed burning. In

scenarios when wildfire smoke impacts are severe, no agricultural burning is allowed. In these scenarios, growers in the Valley must wait for limited burn windows to appear under the right dispersion conditions.

Figure 2 below shows the burn allocation zones in each of the eight counties in the Valley.

Figure 2 Smoke Management System Burn Allocation Zones



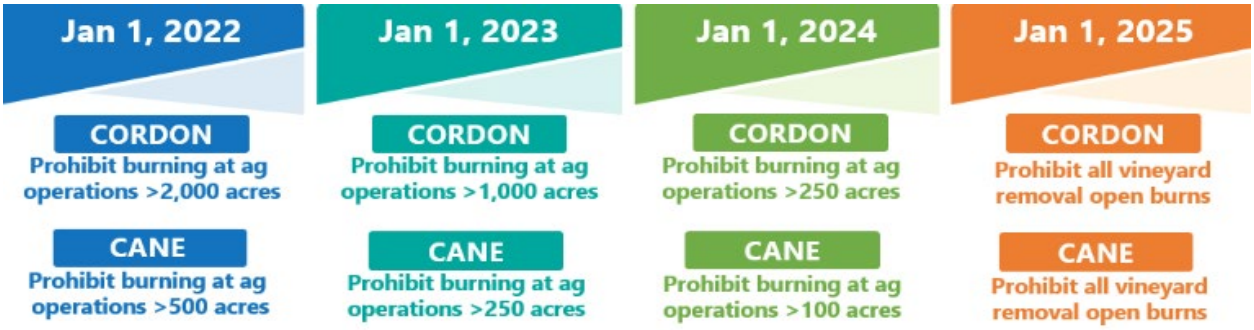
The District has been able to manage emissions effectively from agricultural burning through allocation of emissions across the Valley using the SMS, and strict enforcement through permitting, inspections, and enforcement actions when necessary.

3 Valley's Near-Complete Phase-Out of Agricultural Burning

As the phase-out schedule of agricultural open burning continues to be implemented, further restrictions will come into place, decreasing the amount of woody waste material being handled through open burning even further. The following figure show the phase-out schedules continuing to be implemented over the coming year. By 2025, all vineyards removals, orchard removals (with the exception of apple, pear, and quince crops), and surface harvested prunings will be prohibited.

Figure 3 Upcoming Phase-out Schedule for Remaining Categories

Vineyard Removals



Small Orchard Removals (≤15 acres)

Surface Harvested Prunings

4 Incentive Programs

The costs associated with implementing alternatives to open burning are significantly higher than traditional practices, including disposal at biomass power plants. These alternatives not only provide criteria emission reduction benefits, but are increasingly recognized for providing carbon sequestration benefits. Recognizing these environmental benefits and also the high cost of new emerging agricultural practices, local, state, and federal programs have increasingly been made available, including but not limited to the state's Healthy Soils Program, USDA Tree Assistance Program, and NRCS-USDA Environmental Quality Incentives Program.

The transition to these emerging practices will not be feasible without significant and sustained funding being provided to offset the incremental cost and encourage the adoption of new practices. This section summarizes some of the key available incentive programs at the local, state, and federal level, and highlights the critical need to develop increased and sustained funding at the state and local levels to ensure the feasibility of alternative practices as the region transitions away from traditional combustion practices.

In order to ensure that these programs are effective at assisting Valley growers, the Valley needs to advocate for sufficient funding for these programs. Additionally, the Valley needs to seek policy changes on how the funding is allocated to make the programs more responsive to growers needs.

4.1 District Ag Burn Alternatives Grant Program

The District has taken action to pursue a number of alternatives to open burning, including the adoption of a new pilot incentive program in November 2018, to assist growers in demonstrating new on-field practices for the disposition of agricultural materials. Since inception of the program, the District has seen a very strong demand for this program, initially allocating approximately $25 million in local funding to launch the program. On August 19, 2021, in support of the recently adopted phase-out strategy, the District's Governing Board accepted $178,200,000 in additional state funding to be used in the District's *Ag Burn Alternatives Grant Program*. Of this funding, $30 million was allocated to expand fleet capacity for chipping contractors in the Valley to accommodate the increased demand for these services, with the rest of the funding allocated to offset the growers' cost of chipping and other beneficial alternatives. To address ongoing funding need, the District worked closely with CARB to include the District's *Ag Burn Alternatives Grant Program* as an eligible option in the guidelines for the statewide Community Air Protection (CAP) Program in April 2024, providing the District an additional option for program funding. The District's Governing Board allocated $20,000,000 in available CAP funding upon approval of the CAP Program guidelines.

Over the years since the launch of the pilot program, the District has worked closely with Valley growers, CARB, Valley community members, and other key stakeholders to enhance the program encouraging the emergence of a variety of innovative alternative practices. This well-subscribed program provides incentives to commercial agricultural operations located within District boundaries to chip, shred, or mulch agricultural material from orchard and vineyard removals as an alternative to open burning. Recognizing the variety of agricultural operations in the Valley, the program allows growers to select from several alternative practices for chipped agricultural materials from orchard or vineyard removals, such as, soil incorporation (whole orchard/vineyard recycling), on-site land application on agricultural land, off-site beneficial re-use (mulch, composting, land application near roadways for dust suppression, and other District-approved beneficial re-use of the chipped material). Additionally, the program provides incentives for the use of air curtain burners as an alternative practice, which may only be used to dispose of diseased agricultural material or material with embedded wire. As an ongoing area of enhancement to the program, the Board has approved several program changes to help ensure that smaller agricultural farms have increased and equitable access to incentive funding. Due to the importance of providing continued support for small agricultural operations and to extend the reach of available funding, in January 2024, the District's Governing Board decreased the annual funding cap to 250 acres per year, per entity. While the District has been successful in advocating for additional state funding support, the phase-out of open burning in the midst of large scale crop transitions, water restrictions, and other challenges have resulted in significant program demand, with limited remaining funding that is projected to be depleted in the next few months.

In response to the limited available funding for this program, on November 14, 2024, the District's Governing Board approved programmatic changes to ensure continuity of the program and availability of funding. To ensure continued cost-effective and broad program access to Valley growers, particularly smaller growing operations, applications submitted on or after January 1, 2025 will be limited to funding of 100 acres per year, per entity. Additionally, to extend the limited funding available within the District's grant program to the maximum number of Valley growers, as of January 1, 2025, the program will not allow the option to co-fund with other available programs offering incentives for chipping, grinding, soil reincorporation (whole orchard/vineyard recycling). There are currently several complementary incentive programs available to Valley growers that provide funding for activities covered in the District's *Ag Burn Alternatives Grant Program*, including chipping, shredding, and soil reincorporation. These programs offer approximately $800 per acre or greater for chipping and associated activities, and include, but are not limited to the USDA/NRCS Conservation Stewardship Program, USDA-FSA Tree Assistance Program, the Blue Diamond Climate Smart Practice Program and the California Department of Food and Agriculture Healthy Soils Program. Because these programs offer significant incentives for Valley growers for the same (or similar) activities, staff recommends eliminating the option to co-fund with these other programs. Should a grower wish to participate in one or more of these complementary

programs, they would be ineligible for funding in the District's *Ag Burn Alternatives Grant Program*.

The District has executed $182,344,533 in grants under this program since it was launched in 2018, which has funded the implementation of cleaner practices for the disposal of approximately 258,209 acres of orchard and vineyard removals, equating to nearly 7 million tons of agricultural material diverted from open burning.

The current incentive amounts under the District's grant program are reflected in the table below:

Table 5 Current Incentive Amounts ($/Acre)

Project Type	Orchards	Cane-Pruned Vineyard	Cordon-Pruned Vineyard
Chipping **with** Soil Incorporation (whole orchard/vineyard recycling)	$600 per acre	$800 per acre	$1,300 per acre
Chipping **without** Soil Incorporation (on-site land application)	$300 per acre	$500 per acre	$1,000 per acre
Off-site Beneficial Re-use (mulching, composting, land application near roadways for dust suppression)	$600 per acre	$800 per acre	$1,300 per acre
Air Curtain Burner (**only for diseased material or material with embedded wire**)	$1,000 per acre	$1,000 per acre	$1,000 per acre

**Additional incentive of $400/acre is provided for each incentive category to agricultural operations with 100 total acres or less within the San Joaquin Valley*

Since the launch of the *Ag Burn Alternatives Grant Program*, the District has seen a wide range of participation from a variety of growers. The program has resulted in the deployment of alternative practices at nearly 258,000 acres of orchard and vineyard removals, for nearly 6,990,000 tons of agricultural materials, resulting in the reduction of 13,638 tons of NOx, 25,310 tons of PM and 21,541 tons of ROG emissions as compared to open burning. Table 6 below illustrates program participation details by crop type.

Table 6 Participation by Crop Type (All Time)

Crop Type	Executed Projects	Acres	Tons of Material	Tons of Material (% Valley Total)
Almonds	2,215	163,882	4,916,450	67%
Grapes	1,149	52,883	793,246	11%
Walnuts	632	22,792	683,764	9%
Citrus	333	8,455	253,643	3%
Peaches	256	4,738	142,128	2%
Plums	182	4,192	125,769	2%
Cherry	125	3,281	98,424	1%
Nectarines	154	2,392	71,754	1%
Pistachio	22	1,894	56,817	1%
Olives	59	1,481	44,436	1%
Apricots	45	1,373	41,196	1%
Other	72	2,172	63,726	1%
Total	**5,244**	**269,534**	**7,291,353**	**100%**

**Values are subject to rounding*

In addition, the District has allocated funding for the Assembly Bill (AB) 617 communities of Shafter, South Central Fresno, and Arvin/Lamont. In support of community input that prioritized the reduction of open burning through the use of the District's incentive program, the District has developed and implemented project plans to provide funding for growers within the designated communities.

Summary of Alternatives Funded through Program

Initially, the pilot program provided funding for the chipping of agricultural material and the reuse of this material on-field through soil incorporation, land application of mulch, or other approved on-field practices. In August 2021, the District approved an expanded suite of options for the disposition of chipped material through soil incorporation, land application on grower property or other agricultural property, and other beneficial re-use alternatives such as mulch, composting, calf bedding, and land application near roadways for dust suppression. The following table represents the disposition method of the agricultural material through the program since the launch of the program.

Table 7 Method of Material Disposition (All Time)

Alternative Measure	Executed Projects	Acres	Tons of Material	Tons of Material (% of Valley Total)
Soil Incorporation	4,894	249,767	6,803,641	93.3%
Off-site Beneficial Re-use	164	12,149	356,613	4.9%
Air Curtain Burner	139	6,439	98,918	1.4%
Land Application	47	1,179	32,182	0.4%
Total	**5,244**	**269,534**	**7,291,353**	**100%**

**Values are subject to rounding*

Examples of Beneficial Re-use Alternatives

Calf Bedding

Dust Suppression

Dedicated Funding for Smaller Agricultural Operations

The District Governing Board has continued to prioritize making the program accessible to small farmers through program enhancements. Since December 2020, the District has directed 30% of available funding be initially set aside for smaller agricultural operations, less than 500 acres in size. The table below illustrates the allocation of total incentive funding to small and large growers since December 2020.

Table 8 Allocation to Small and Large Growers since December 2020

Ag Operation Size	Executed Projects	Grant $	Grant $ (% of Valley Total)
500 acres or less	2,497	$59,464,059	34%
Greater than 500 acres	2,157	$ 116,488,727	66%
Total	**4,654**	**$ 175,952,786**	**100%**

In addition to the 30% set aside for growers with 500 acres or less, in August 2021, the District allocated an additional $100 per acre for each funding category for small growers less than or equal to 100 acres in size. In February 2023, the District approved updates to the program to increase the small grower funding to an additional $400 per acre. The following table illustrates the total funding that has been allocated to growers 100 acres or less in size since the program was re-launched on September 1, 2021, and as a percentage of total projects and funding in that time period.

Table 9 Allocation to Small Growers with 100 Acres or

Ag Operation Size	Executed Projects	Grant $	Projects (% of Valley Total)	Grant $ (% of Valley Total)
100 acres or less	1,138	$25,493,850	26%	15%

**Less since September 1, 2021*

The District will continue to monitor the grant program's participation levels to ensure that the program is responsive to the needs of the Valley's agricultural community, particularly with smaller growers that may face unique difficulties in implementing the new phase-out requirements. The District will continue to engage with Valley agricultural organizations and community-based organizations that have strong ties to smaller growers in the Valley to partner on outreach efforts, and will continue to seek opportunities to provide additional, targeted outreach to smaller growers.

Ag Burn Alternatives Fleet Expansion

To ensure adequate capacity to accommodate the increase in agricultural chipping throughout the Valley in the coming years, particularly for smaller agricultural operations, the District allocated up to $30,000,000 of the new state funding for new chipping/grinding equipment purchases within the program. New equipment purchased with this funding is used specifically and solely for expanding chipping capacity in the Valley and accommodating the needs of Valley agricultural operations as open burning is phased out. Since opening this new option, the District has seen significant interest from chipping contractors in purchasing additional equipment. To date, the District has executed contracts for 55 pieces of equipment for a total of $29,634,924. All 55 pieces of equipment have been deployed, substantially increasing chipping capacity throughout the Valley and providing broad access to chipping services to support the phase-out strategy. The following table represents the equipment funded by the District since September 1, 2021:

Table 10 New Chipping Equipment Purchases since September 1, 2021

County/Equipment Type	Equipment Count	Sum of Grant Funding	Estimated Acres/Yr.
Grinder	10	$1,614,097	3,000
Horizontal Grinder	37	$26,929,211	49,200
Masticator	2	$818,481	730
Magnetic Equipment for Cordon	6	$273,135	-
Total	**55**	**$29,634,924**	**52,930**

4.2 CDFA Healthy Soils Program

The California Department of Food and Agriculture (CDFA) provides incentive funding through the Healthy Soils Program, which stems from the California Healthy Soils Initiative, a collaboration of state agencies and department that promotes the development of healthy soils on farmlands and ranchlands. The program has three components, including incentives to California growers, demonstration projects that conduct research, and promoting the widespread adoption of conservation management practices throughout California. The program provides financial assistance for the implementation of conservation management practices that improve soil health and reduce emissions of carbon and greenhouse gases (GHG). The demonstration projects display the implementation of conservation practices by California farmers and ranchers. The soil management practices promoted through this program include cover cropping, no-till, reduced-till, mulching including whole orchard recycling, compost application, and conservation plantings. Applications deemed complete are reviewed and ranked by a technical review committee based on project logistics, project design, project work plan, project budget, GHG emission reduction, and conservation plan if applicable. Funding priority is given to socially disadvantaged farmers and ranchers, and benefits to priority populations.

In regards to open agricultural burning, the program offers $861.42 per acre for whole orchard recycling for orchards with trees at least 10 years of age. Once the orchard is chipped, the chips must be reincorporated in the same place as which they were grown to at least 6 inches depth, without exporting chips off-site or to new fields. The chips

are to be evenly distributed throughout the orchard. Finally, this practice must not be implemented in soils with Soil Organic Matter greater than 20%. Following woodchip incorporation, the land must be fallowed or replanted with trees within three years. The total grant amount for all implemented practices cannot exceed the maximum grant amount of $100,000 per project. No funding priority is given to whole orchard recycling projects.

The Healthy Soils Program has received multiple rounds of funds through the Greenhouse Gas Reduction Fund (part of California Climate Investments), the State's General Fund, and the Parks and Water Bond of 2018 (Proposition 68). Since 2017, the Healthy Soils Program has awarded $167 million to 1,467 incentive projects. In the 2023-24 funding round, the available funding for on-farm projects was about $11 million through the Healthy Soils Program. The solicitation for new projects and applications is currently closed for the remainder of the year. The most recent projects were funded in 2021 and of those projects funded, five Valley farms were awarded incentives for whole orchard recycling.

4.3 Environmental Quality Incentives Program

National Air Quality Initiative

The U.S. Department of Agriculture - Natural Resources Conservation Service (NRCS-USDA) provides incentive funding through the Environmental Quality Incentives Program (EQIP) to agricultural producers to address concerns in relation to natural resources. Practices funded by the program aim to improve a variety of environmental concerns including water and air quality, wildlife habitat, ground and surface water, soil health, soil erosion and sedimentation, and weather volatility. Farmers, ranchers, and forest landowners who own or rent their agricultural land are eligible for the program. The EQIP is authorized under the federal Farm Bill, which is generally re-authorized for a five-year period. In recent years, California has received approximately $20-25 million in EQIP funding for air quality each year, and $22 million this past fiscal year. Those funds are channeled into three air fund pools consisting of: 1) replacing mobile farm equipment, 2) replacing irrigation pump engines, and 3) farm conservation management practices. The vast majority of those funds, approximately $18.5 million for the 2024 fiscal year, is used for replacing mobile farm equipment, such as tractors.

The California Air Quality Initiative

The farm conservation management practices portion of the program, which allocated approximately $1 million in funds and approximately $2 million for the 2024 fiscal year, covers a variety of practices, including chipping/grinding of tree orchards, whole orchard recycling/incorporating ground tree orchard material into the soil, low-dust nut harvester equipment, air curtain burners, conservation tillage, treating unpaved roads, precision pest management (e.g. smart sprayers), disposal of treated stakes, and manure

injection. The program funding schedules are as follows, including rates for historically underserved (HU) growers:

- Practice 376 Field Operations Emissions Reduction – Chipping tree orchard material: $1,090.69 /acre and $1,308.83 acre (HU)
- Practice 336 Soil Carbon Amendment – Other Carbon Amendment/Whole Orchard Recycling (incorporation of chipped material): $723.76 /acre and $868.51/acre (HU)
- The incentive limit per Farm Bill is $450,000
- Growers with an adjusted gross income greater than $900,000 are excluded from the program.

From fiscal years 2009 through 2024, the NRCS-USDA contracted with 162 farmers to provide a total of $2,480,000 to chip orchard removal debris on 8,285 acres. These incentives have resulted in a reduction of 907 tons of PM2.5 and 646 tons of NOx in the Valley. NRCS-USDA also offers $157.20 per acre ($188.64 per acre for HU farmers), or $125.61 per acre for larger operations equal to or over 60 acres ($150.73 per acre for HU farmers), to incentivize the use of air curtain burners. However, Valley farmers have yet to take advantage of this incentive.

5 Evaluation and Recommendations for Remaining Materials

The San Joaquin Valley is the only region in the nation with stringent requirements to phase out agricultural open burning. Through the implementation of state law under SB 705, the District has adopted prohibitions that have significantly reduced open burning, supported by continued efforts to identify and demonstrate new alternatives to reduce open burning. Since adoption of the District's final phase-out strategy in 2021, the Valley has seen a tremendous reduction in open burning through the adoption of new practices. Demonstrated below is the District's recommendation and analysis for the following crops: apple, pear, and quince removals; limited amounts of rice straw (which has the potential for risk of disease), diseased crops and materials, weeds affecting ponding and levee banks, and weeds and other maintenance.

5.1 Field Crops (Rice Straw or Rice Field Levees)

Per District Rule 4103, field crops includes alfalfa, asparagus, barley stubble, beans, corn, cotton, flower straw, hay, lemon grass, oat stubble, pea vines, peanuts, rice stubble, safflower, sugar cane, vegetable crops, and wheat stubble, and other field crops, as determined by the State Board. The table below identifies the historical open burning tonnage of field crops, which has decreased since the establishment of SB 705.

Table 11 Field Crops Tonnage Burned Averages

Crop Category	Pre-SB 705 Average Tons Burned/yr (2000-2005)	Average Tons Burned/yr (2006-2023)	Average Tons Burned/yr (2020-2023)
Rice Straw or Rice Field Levees	27,062	4,081	445

All field crops have previously been prohibited from open burning with the exception of rice. Therefore, this evaluation will focus on rice straw, and burning of weeds and vegetative materials on rice field levees and banks.

Discussion

Most of the rice grown in the Valley is grown in the northern part of the air basin. Rice is planted in the spring and harvested in the fall. Once the rice is harvested, the rice straw remains in the field for disposition. Reducing the amount of post-harvest straw residue in the rice fields is important to the successful production of the next crop. Burning has been the historical cultural practice for removing straw and residues for the California rice industry. Burning rice straw helps prepare the field for the next rice crop as burning destroys any diseases in the rice straw of the current crop. The University of California Agronomy Research & Information Center on Rice explains the many types of diseases that can grow from improper preparation of rice fields, including but not limited to Bakanae, Stem Rot, Rice Blast, and Kernel Smut. As a result, it is imperative that rice growers are able to burn a portion of their field as post-harvest straw residue builds up.

The District compared the current allowed acreage burned for rice straw in the Valley to the Sacramento Valley Air Basin, where approximately 98% of the rice acreage in the state is grown. Currently, CH&SC §41865 allows for a total of 125,000 acres burned or 25% of the individual rice acreage farmed by the operator per year to be burned in the Sacramento Valley. The Sacramento Valley Basinwide Air Pollution Control Council (BCC), which consists of elected officials designated by Sacramento's Governing Board, determines the maximum percentage applicable to all growers subject to the conditions for conditional rice straw burning permits. Additionally, the BCC ensures compliance of the Conditional Rice Straw Burning Permit Program elements.

In the Valley there are very small specialty markets for two other alternatives for rice straw. One such alternative is utilizing the rice straw as cattle feed. Only certain cattle will eat rice straw, and the straw needs to be processed and mixed at a specific moisture content, as well as being chopped into specific sizes for feed. The other alternative is utilizing the rice straw as erosion control by packing and rolling the straw into long tubular rolls called rice wattles. Wattles then can be laid out to control sediment and prevent soil erosion.

According to the District's burn data for rice straw, the acreage of rice straw burned has significantly decreased, with the average acreage burned from 2020 through 2023 at 152 acres (445 tons) annually. The District is recommending continued limited open burn prohibition postponement for rice straw through the ongoing allowance of 20% of the acreage to be treated by burning on a rotational, multi-year basis. This will continue to generally align the District's burn requirements with the CH&SC §41865 for the Sacramento Valley Air Basin, with the District's limited allowance of 20% per year being more stringent than Sacramento Valley's 25% per year. This limited remaining burning allowance would address the potential issues of disease or fungus contamination that can arise when utilizing alternatives such as soil incorporation on rice fields without targeted, limited burning treatment on a multi-year rotating basis.

Lastly, the District is recommending continued open burning prohibition postponement for weeds and vegetative materials on rice field levees and banks. Landowners and operators have considered using hand crews for removing weeds, but found the alternative to be impractical. Landowners and operators typically mow and spray most of the weeds, or use flame desiccation for direct heating of residual weed foliage and overgrowth of weeds to assure the destruction of weed seeds. In remote locations, such as rice field levees and banks, fire is the only option for effective control of weed seeds and for safety of workers.

In addition, burning weeds is the most effective option to slope the banks to stabilize them and allow the water to flow easily, with less erosion. Rodents, such as gophers, have also been a concern around levees, including some ground squirrels that have bored through entire levees. Standing weeds make it nearly impossible to check the banks for rodents, which can cause ditch breaks or erosions and lead to flooding of surrounding areas. Prohibition of open burning in these areas could also increase additional use of other chemicals for pest control.

Findings and Recommendations

As documented in Table 2, the District reaches the following findings for this category in support of the *2024 Report* and recommendations under Rule 4103:

1. Recommend continued limited postponement of prohibitions for rice straw due to disease issues/concerns and need for targeted, rotating treatment of rice acreage (no additional feasible alternatives).
2. Recommend continued limited postponement of prohibitions for weeds and other vegetative materials on rice field levees and banks, as mowing and herbicides are not viable alternatives due to slopes and water contamination issues.

5.2 Prunings (Apple, Pear, Quince)

Prunings (not including surface harvested crops) are the vegetative material produced from the regularly scheduled removal of any portion of the agricultural crop for the purpose of achieving a desired size and shape, or to promote plant growth for improved cultivation, harvesting, and maintenance of crop health. The regularly scheduled removal does not include the incidental cuttings of dead or broken branches, water-sprouts or suckers, and other damaged crops. This category includes prunings from apple crops, apricot crops, avocado crops, bushberry crops, cherry crops, Christmas trees, citrus crops, date crops, eucalyptus crops, fig crops, kiwi crops, nectarine crops, nursery prunings, olive crops, pasture or corral trees, peach crops, pear crops, persimmon crops, pistachio crops, plum crops, pluot crops, pomegranate crops, prune crops, quince crops, rose crops, and other prunings, as determined by the State Board. The table below identifies the historical open burning tonnage of prunings, which has decreased since the establishment of SB 705.

Table 12 Prunings (not including surface harvested crops) Tonnage Burned Averages

Crop Category	Pre-SB 705 Average Tons Burned/yr (2000-2005)	Average Tons Burned/yr (2006-2023)	Average Tons Burned/yr (2020-2023)
Apple, Pear, Quince Prunings	4,069	664	186

All crop type prunings have been prohibited from open burning with the exception of apple, pear, and quince. Therefore, this evaluation will focus on prunings of apple, pear, and quince.

Discussion

Pome fruit including apple, pear, and quince crops are susceptible to a disease called fire blight. Fire blight is a destructive bacterial disease that kills blossoms, shoots, limbs, and sometimes the entire tree. Insects, wind, and mechanical devices can spread fire blight. According to agricultural representatives and agricultural commissioners, fire blight can destroy an entire orchard in a single season if left uncontrolled. The bacterium can be easily transmitted to susceptible tissue by contact. The equipment used to prune the trees are routinely sterilized with antibacterial agents when moving from one tree to the next to mitigate exposure to the disease or potential disease. The unrestricted movement of infected tissue will cause the disease to spread rapidly under certain environmental conditions (hot and wet). Containment of the infected tissue is an essential element for control. Farmers can utilize pest management strategies to attempt to limit the spread of bacteria, including pruning cankers in the winter and growing season, applying control products, and developing a balanced nutrition program.[6] However, when an area on a tree is infected by fire blight, it can produce dead localized areas of bark known as cankers. These cankers must be pruned and burned immediately each winter before any normal dormant pruning occurs to ensure destroying any overwintering bacteria.[7]

Apple, pear, and quince prunings are burned to combat further spread of fire blight within orchards and to prevent potential infection of nearby orchards. Under the District's SMS, an average of 81 acres (186 tons) of apple, pear, and quince prunings were burned annually from 2020 to 2023. Operators and county agricultural commissioners have indicated that there is a lack of effective treatment for fire blight. Chemicals that are used to control the bacterial disease could prove ineffective if the disease becomes resistant over time. According to agricultural commissioners, the options for controlling fire blight that is becoming resistant to chemical means of control

[6] UC IPM. *Pests in Gardens and Landscapes*. Retrieved from: https://ipm.ucanr.edu/PMG/PESTNOTES/pn7414.html

[7] PennState Extension. *Apple and Pear Disease – Fire Blight, Dormant Removal of Cankers.* (June 29, 2023). Retrieved from: https://extension.psu.edu/apple-and-pear-disease-fire-blight-dormant-removal-of-cankers

with Streptomycin are burning on site or disposal by placing infected plant material in double plastic bags for burial.

Findings and Recommendation

As documented in Table 2, the District reaches the following findings for this category in support of the *2024 Report* and recommendations under Rule 4103:

1. No technologically feasible alternative due to disease issues, specifically fire blight
2. Recommend continued limited postponement of prohibitions for prunings from apple, pear, and quince crops

5.3 Orchard Removals (Apple, Pear, Quince)

Orchard removals includes, but are not limited to, orchard removal matter, stumps, and untreated sticks. Notably, the District's adopted phase-out strategy includes the near-complete phase-out of orchard removals. After January 1, 2025, all orchard removals with the exception of apple, pear, and quince will be prohibited from burning. Therefore, this evaluation will focus on apple, pear, and quince orchard removals.

Table 13 Orchard Removals Tonnage Burned Averages

Crop Category	Average Tons Burned/yr (2006-2023)	Average Tons Burned/yr (2020-2023)
Apple, Pear, Quince Orchard Removals	2,673	1,313

Discussion

As mentioned above for prunings from some fruits, crops such as apples, pears, and quince are susceptible to fire blight, a bacteriological disease that can spread through insects, wind, and mechanical devices and kills blossoms, shoots, limbs, and sometimes the entire tree. In most cases, the on-set of fire blight is unidentifiable and can be spread by contact or exposure to other healthy orchard material. For orchard removals, the equipment used to cut or remove the tree are also routinely sterilized with antibacterial agents to mitigate exposure to the disease or potential disease.

Similar to pruning, orchard removals from apple, pear, and quince crops need to be burned to combat further spread of fire blight within orchards and to prevent potential infection of nearby orchards. Farmers can utilize pest management strategies to attempt to limit the spread of bacteria, including pruning cankers in the winter and growing season, applying control products, and developing a balanced nutrition

program.[8] However, when an area on a tree is infected by disease, such as fire blight, it can produce dead localized areas of bark known as cankers. These cankers must be pruned and burned immediately each winter before any normal dormant pruning occurs to ensure destroying any overwintering bacteria.[9]

As indicated by operators and county Ag commissioners, there is a lack of effective treatment for fire blight. Growers have considered chipping the orchard removals and transporting the materials to biomass facilities. However, the primary concern with each of the alternatives is spreading the disease.

As a result, burning is the preferred and most viable method used in the Valley to dispose of these crops in order to avoid potential spread and exposure of the fire blight disease. Under the District's SMS, an average of 44 acres (1,313 tons) of apple, pear, and quince orchard removals were open burned annually from 2020 to 2023.

Findings and Recommendation

As documented in Table 2, the District reaches the following findings for this category in support of the *2024 Report* and recommendations under Rule 4103:

1. No technologically feasible alternative due to disease issues, specifically fire blight.
2. Recommend continued limited postponement of prohibitions for orchard removal open burns from apple, pear, and quince.

5.4 Weed Abatement (Ponding and Levee Banks)

Weed abatement refers to the reduction or removal of noxious weeds and grasses. Weed abatement includes, but is not limited to, berms, Bermuda grass, fence rows, grass, pasture, and ponding or levee banks. The District has phased out open burning of berms, Bermuda grass, fence rows, grass, and pasture. Burning prohibitions for weed abatement activities on ponding and levee banks has been postponed due to feasibility issues. The table below identifies the historical open burning tonnage for weed abatement, which has decreased since the establishment of SB 705.

[8] UC IPM. *Pests in Gardens and Landscapes*. Retrieved from: https://ipm.ucanr.edu/PMG/PESTNOTES/pn7414.html

[9] PennState Extension. *Apple and Pear Disease – Fire Blight, Dormant Removal of Cankers.* (June 29, 2023). Retrieved from: https://extension.psu.edu/apple-and-pear-disease-fire-blight-dormant-removal-of-cankers

Table 14 Weed Abatement Tonnage Burned Averages

Crop Category	Pre-SB 705 Average Tons Burned/yr (2000-2005)	Average Tons Burned/yr (2006-2023)	Average Tons Burned/yr (2020-2023)
Ponding and Levee Banks	185	141	72

All weed abatement activities have been prohibited from burning, with the exception of weed abatement activities affecting ponding and levee banks. Therefore, this evaluation will focus on weed abatement on ponding and levee banks.

Discussion

While some weeds and locations lend themselves to Best Management Practices, there remains a need for limited burning of some weeds. As mentioned earlier, this analysis does not include the category for "other weeds and maintenance". The CH&SC required the District to establish best management practices in 2005 for the control of other weeds and maintenance, which includes ditch bank work, canal bank work, dodder weed, star thistle, tumbleweeds, noxious weeds, pesticide sacks, and fertilizer sacks. Since the implementation, landowners and irrigation districts have continued to do their part to reduce burning by seeking alternative ways to manage weeds. The best management practices in the rule were developed in collaboration with affected sources and are alternatives that must be considered prior to any open burning. Landowners and operators have also opted for more mechanical and chemical control of weeds and only burned at times when conditions, such as remote locations or other requirements, prevent other alternative practices.

Since 2005, open burning has no longer been allowed for weed abatement activities from berms, fence rows, pasture, grass, and Bermuda grass. However, limited open burning is currently allowed for weed abatement activities affecting surface waterways, including ponding and levee banks. Under the District's SMS, an average of 33 acres (72 tons) of weeds affecting ponding and levee banks were open burned annually from 2020 to 2023. The following materials are not considered to be part of the burn allowance for weed abatement activities affecting surface waterways, ponding, and levee banks: 1) weeds that originate from outside and away from the surface waterways, ponding or levee banks and 2) any other debris or materials that are gathered from surface waterways, ponding, or levee banks, such as tree limbs or foreign materials.

There are currently no feasible alternatives to burning all of the weeds along surface waterways, ponding, and levee banks. Landowners and operators typically mow and spray most of the weeds, or use flame desiccation for direct heating of residual weed foliage and overgrowth of weeds to assure the destruction of weed seeds. In many remote locations along surface waterways, ponding, and levee banks, fire is the only option for effective control of weed seeds and for safety of workers.

In addition, burning weeds is the most effective option to slope the banks to stabilize them and allow the water to flow easily, with less erosion. Rodents, such as gophers, have also been a concern around levees, including some ground squirrels that have bored through entire levees. Standing weeds make it nearly impossible to check the banks for rodents, which can cause ditch breaks or erosions and lead to flooding of surrounding areas. Complete prohibition of open burning in these areas could also increase additional use of other chemicals for pest control.

EPA and the State and Regional Water Boards continue to push to eliminate the use of chemicals near any waterway. Recognizing these issues, many landowners and operators are controlling the use of chemicals along surface waterways, ponding, and levee banks due to concerns over runoff of chemicals from land to waterways. The California Porter-Cologne Water Quality Act regulates the discharge of waste into ambient waters, and authorizes Regional Boards to impose requirements on waste dischargers after consideration of several factors. Along with other responsibilities, the Regional Boards also regulate all pollutant or nuisance discharges that may affect either surface water or groundwater. One of the purposes of the federal Water Pollution Control Act (or Clean Water Act) is to restore and maintain the chemical, physical, and biological integrity of the nation's waters by preventing point and nonpoint pollution sources.

As burning remains the only feasible option for disposal of weed abatement activities affecting ponding and levee banks, the District is recommending the continued postponement of prohibiting open burning for this material.

Findings and Recommendation

As documented in Table 2, the District reaches the following findings for this category in support of the *2024 Report* and recommendations under Rule 4103:

1. No feasible alternative as mowing and herbicides are not viable alternatives due to slopes and water contamination issues.
2. Recommend continued limited postponement of prohibitions for weed abatement activities affecting surface waterways, including ponding and levee banks.

5.5 Other Materials

Other materials includes, but is not limited to brooder paper, deceased goats, and diseased beehives. The District has prohibited open burning from brooder paper and diseased goats, and therefore will only be evaluating diseased beehives in this report. The table below identifies the historical open burning tonnage of other materials, which has decreased since the establishment of SB 705.

Table 15 Other Materials Tonnage Burned Averages

Crop Category	Pre-SB 705 Average Tons Burned/yr (2000-2005)	Average Tons Burned/yr (2006-2023)	Average Tons Burned/yr (2020-2023)
Diseased Beehives	138	70	21

All other materials have been prohibited from burning, with the exception of diseased beehives. Therefore, this evaluation will focus on diseased beehives.

Discussion

Bees are a key component in the growing of crops. The U.S. Department of Agriculture (USDA)[10] has emphasized the critical role bees and other pollinators play in our food production system. More than 100 U.S. grown crops rely on pollinators, while $700 million of honey bee products and services are sold annually. Specifically, honey bee pollination increases crop production for fruits, nuts, vegetables, legumes, oilseeds, and forage crops. Additionally, according to research conducted at MDPI,[11] pollination by animals improves the global crop output by an additional $235 to $577 billion annually and without animal pollination, 5 to 8% of crop production would be lost. In light of this, it is vitally important to growers that the supply and availability of bees are protected to the highest degree possible.

Artificial beehives serve two purposes: production of honey and pollination of crops. The hives are commonly transported so the bees can pollinate crops in selected areas. Modern beehives are usually constructed of wood and consist of several parts, which include the following:

- Bottom board - this has an entrance for the bees to get into the hive.
- Brood box - is the most bottom box of the hive and is where the queen bee lays her eggs.
- Honey Super - same as brood box, but is the upper-most box where honey is stored.
- Frames and Foundation - wooden frame and plastic sheet with honeycomb impression where bees build wax honey combs.
- Inner and Outer Cover - As the name implies.

Beekeepers have experienced several problems in the past few years. A recent development is the problem of colony collapse disorder (CCD), a phenomenon where

[10] U.S. Department of Agriculture. *Pollinators at a Crossroads.* (June 24, 2020). Retrieved from: https://www.usda.gov/media/blog/2020/06/24/pollinators-crossroads

[11] MDPI. *Overview of Bee Pollination and Its Economic Value for Crop Production.* (July 31, 2021). Received from: https://www.researchgate.net/publication/353604857_Overview_of_Bee_Pollination_and_Its_Economic_Value_for_Crop_Production

bees mysteriously abandon their hives. The USDA[12] reports that annual colonies losses were 42.1% for 2014-2015, 34.2% for 2013-14, 45% for 2012-2013, 28.9% for 2011-2012, and 36.4% for 2010-2011. Most recently, the USDA reported that honey bee colonies lost to CCD on operations with five or more colonies from January through March 2023, has increased by 25% for the same quarter in 2022.[13]

Section 29207-29208 of California Code of Regulations Title 3, Food and Agricultural Code, Division 13, Bee Management and Honey Production, requires that "If American foulbrood is found in an apiary, the abatement shall be by killing the bees in the infested colonies and disposing of the hives and their contents, together with any other infested comb, hives, and associated appliances which are found in the apiary, in one of the following ways: If abatement is by burning, the person abating shall act in accordance with applicable air pollution control district or air quality maintenance district regulations and state and local fire control laws. If the regulations or laws prohibit burning immediately, the diseased colonies shall be sealed and placed in an enclosed structure and thereafter burned on the first date allowed by the regulation or law. All the activities shall be reported to the inspector prior to burning, who may require that burning occur only under his or her supervision."

Due to the lack of alternatives, the District has allowed open burning of diseased beehives under the SMS, in which an average of 10 acres (21 tons) of diseased beehives were open burned annually from 2020 to 2023. As burning remains the only feasible option for disposal of these diseased beehives, the District is recommending the continued postponement of prohibiting open burning for this material.

Findings and Recommendation

As documented in Table 2, the District reaches the following findings for this category in support of the *2024 Report* and recommendations under Rule 4103:

1. No technologically feasible alternative due to disease issues.
2. Recommend continued limited postponement of prohibitions for diseased beehives.

[12] USDA. *Bee Survey: Lower Winter Losses, Higher Summer Losses, Increased Total Annual Losses*. (May 13, 2015). Retrieved from: https://www.ars.usda.gov/news-events/news/research-news/2015/bee-survey-lower-winter-losses-higher-summer-losses-increased-total-annual-losses/

[13] USDA, National Agricultural Statistics Service. *Honey Bee Colonies.* (August 1, 2023). Retrieved from: https://downloads.usda.library.cornell.edu/usda-esmis/files/rn301137d/4m90gc28p/gq67m7401/hcny0823.pdf

6 Continued Challenges and Needed Support

As final phase-out dates approach, Valley agriculture continues to face challenges such as drought conditions, new water requirements under the Sustainable Groundwater Management Act (SGMA), continued loss of historical alternatives such as biomass plants, and changing crop economics.

Valley farmers continue to be impacted by ongoing and worsening drought conditions. Further compounding this issue, SGMA, a three-bill legislative package, created a framework for sustainable groundwater management, requiring governments and water agencies located in high and medium priority basins to balance groundwater basin levels. High and medium priority basins must reach a balanced level of pumping and recharge by 2042. Similarly, over-drafted basins must reach these levels by 2042. Groundwater Sustainability Agencies (GSAs) must submit and adopt Groundwater Sustainability Plans (GSPs) outlining how they plan to meet their specified deadline. Due to being an over-drafted area, areas in the San Joaquin Valley are expected to be greatly impacted by the water restrictions, resulting in increased costs, impacted crop economics, and extensive removal or fallowing of acreage.

In addition to these challenges, ongoing identification and development of alternatives to open burning will be critical to support the ongoing phase-out strategy. Biomass power plants have historically provided a significant alternative to the open burning of agricultural waste. However, several biomass plants have recently closed as a result of the evolving energy markets and lower energy prices offered by utilities upon contract renewal. This decrease in the number of biomass facilities has significantly reduced the available alternatives to open agricultural burning.

6.1 State and Federal Funding

Securing additional state and federal funding will be critical to ensuring the success of the phase-out through the ongoing development and deployment of chipping, composting, bioenergy, and other beneficial alternatives in the face of drought, biomass, and other challenges. As described earlier, there is limited remaining funding available under the District's *Ag Burn Alternatives Grant Program*, and program demand is high with continued increases in demand from small growers. Ongoing funding for the District's program is crucial and continued collaboration with CARB, other public agencies, and agricultural industry partners is needed to ensure adequate funds are secured. Towards that end, working with agricultural and other Valley stakeholders, the District will continue to advocate for additional state and federal funding to support the transition away from open burning in the Valley. The District will also continue to look for opportunities to support Valley growers in leveraging complementary state and federal programs and extend their reach in the Valley, such as the USDA-NRCS EQIP program and the CDFA Healthy Soils program.

7 Determinations Required by State Law

7.1 Economic Feasibility

The District has determined that there were no technologically or economically feasible alternatives to managed burning for the remaining crop types without incentives.

7.2 Federal and State Commitment for Biomass Facilities

The District has determined that there were no long-term federal or state funding commitments for the operation of biomass facilities or development of alternatives to burning. The District supports legislation that will encourage, promote, and facilitate alternative uses for agricultural material. The District also supports policies and initiatives that encourage renewable energy and energy efficiency, including supporting legislation that provides additional biomass capacity utilizing agricultural materials.

7.3 Air Quality Impacts

The District determined that the continued issuance of burn permits would not cause or substantially contribute to a violation of an applicable federal ambient air quality standard. The District's Smoke Management System (SMS) manages burning of agricultural waste materials. The SMS uses a combination of real-time meteorological information and computer modeling to determine the allowable amount and location of agricultural burning. District's use of the SMS would limit combustion emissions to levels below the violation threshold of any applicable federal ambient air quality standard.

7.4 California Air Resources Board Concurrence

CARB has concurred with all previous District determinations. The District has worked with CARB toward a concurrence with the determinations, as required by CH&SC §41855.6. The District will forward this *2024 Report* with the District's recommendations to CARB for review and transmittal to EPA.

8 Conclusion

The District developed a transparent and measurable reduction plan with reduction benchmarks, as outlined in the *2020 Report* and *2021 Supplemental Report*, for the near-complete phase-out of open agricultural burning by January 1, 2025. This *2024 Report* concludes the District's evaluation of open agricultural burning, as the limited crops that are allowed to burn do not significantly contribute to the Valley's attainment status and it is not technologically or economically feasible to prohibit burning of these crops. The District will continue to allow burning of limited amounts of rice straw (which has the potential for risk of disease), diseased crops and materials, weeds affecting ponding and levee banks, and weeds and other maintenance, as defined by Rule 4103.

All limited remaining burning will continue to be managed closely through the District's Smoke Management System. Agricultural burning will continue to decrease in the Valley due to the already implemented strict phase-out schedule and the ongoing transition to cleaner alternatives, with the assistance of the District's incentive program. The continued issuance of burn permits for these limited materials will not result in an exceedance of federal ambient air quality standards, impact smoke-sensitive receptors, or cause a public nuisance; therefore the District is requesting postponement of the remaining crop types along with CARB concurrence with the District's recommendations provided in this *2024 Report*.

This page intentionally blank.

APPENDIX A – SUMMARIZED INFORMATION FROM CH&SC SECTION 41855.5

Appendix A: SUMMARIZED INFORMATION FROM CH&SC SECTION 41855.5

Category Definitions List

CHSC Section 41855.5 defines Agricultural Material Categories as follows:

"Field crops" means any of the following crops:

(A) Alfalfa	(B) Asparagus	(C) Barley stubble
(D) Beans	(E) Corn	(F) Cotton
(G) Flower straw	(H) Hay	(I) Lemon grass
(J) Oat stubble	(K) Other field crops, as determined by the state board	
(L) Pea vines	(M) Peanuts	(N) Rice stubble
(O) Safflower	(P) Sugar cane	(Q) Vegetable crops
(R) Wheat stubble		

"Orchard removals" includes, but is not limited to, any of the following:

(A) Orchard removal matter	(B) Stumps	(C) Untreated sticks

"Other materials" includes, but is not limited to, any of the following:

(A) Brooder paper	(B) Deceased goats	(C) Diseased bee hives

"Other weeds and maintenance" includes, but is not limited to, any of the following:

(A) Ditch bank work	(B) Canal bank work	(C) Dodder weed
(D) Star thistle	(E) Tumbleweed	(F) Noxious weeds
(G) Pesticide sacks	(H) Fertilizer sacks	

"Prunings" means prunings from any of the following:

(A) Apple crops	(B) Apricot crops	(C) Avocado crops
(D) Bushberry crops	(E) Cherry crops	(F) Christmas trees
(G) Citrus crops	(H) Date crops	(I) Eucalyptus crops
(J) Fig crops	(K) Kiwi crops	(L) Nectarine crops
(M) Nursery prunings	(N) Olive crops	(O) Other prunings, as determined by the state board
(P) Pasture or corral trees	(Q) Peach crops	(R) Pear crops
(S) Persimmon crops	(T) Pistachio crops	(U) Plum crops
(V) Pluot crops	(W) Pomegranate crops	(X) Prune crops
(Y) Quince crops	(Z) Rose prunings	

"Surface harvested prunings" includes, but is not limited to, any of the following:

(A) Almond prunings	(B) Walnut prunings	(C) Pecan prunings
(D) Grape vines	(E) Vineyard removal materials	

"Vineyard materials" includes, but is not limited to, any of the following:
(A) Grape canes (B) Raisin trays

"Weed abatement" includes, but is not limited to, any of the following:
(A) Berms (B) Bermuda grass (C) Fence rows
(D) Grass (E) Pasture (F) Ponding or levee banks

OPEN BURN PROHIBITION SCHEDULE

State law requires burning to be prohibited for the following crops on the dates listed unless demonstrated to be economically unfeasible:

6/1/05	Field Crops			
	Alfalfa	Asparagus	Barley Stubble	Beans
	Corn	Cotton	Flower Straw	Hay
	Lemon Grass	Oat Stubble	Other Field Crops as determined by state board.	Pea Vines
	Peanuts	Rice Stubble	Safflower	Sugar Cane
	Vegetable Crops	Wheat Stubble		
	Prunings			
	Apple Crops	Apricot Crops	Avocado Crops	Bushberry Crops
	Cherry Crops	Christmas Trees	Citrus Crops	Date Crops
	Eucalyptus Crops	Fig Crops	Kiwi Crops	Nectarine Crops
	Nursery Prunings	Olive Crops	Other Prunings as determined by state board.	Pasture or Corral Trees
	Peach Crops	Pear Crops	Persimmon Crops	Pistachio Crops
	Plum Crops	Pluot Crops	Pomegranate Crops	Prune Crops
	Quince Crops	Rose Prunings		
	Weed Abatement			
	Berms	Bermuda Grass	Fence Rows	Grass
	Pasture	Ponding or Levee Banks		

Establish best management practices for control of weeds/maintenance effective 6/1/06:

Other Weeds and Maintenance			
Ditch Bank Work	Canal Bank Work	Dodder Weed	Star Thistle
Tumbleweed	Noxious Weeds	Pesticide Sacks	Fertilizer Sacks

6/1/07	Orchard Removals		
	Stumps	Orchard Removal Matter	Untreated Sticks

6/1/10	Other Materials			
	Brooder Paper	Deceased Goats	Diseased Bee Hives	
	Surface Harvested Prunings			
	Almond Prunings	Walnut Prunings	Pecan Prunings	Grape Vines
	Vineyard Removal Materials			
	Vineyard Removals			
	Vineyard Materials			
	Grape Canes	Raisin Trays		