10 Air Quality

This chapter is based on Appendix C, *Air Quality and Greenhouse Gas Emissions Technical Report*. It presents the environmental setting for the Marin/Sonoma Mosquito Vector Control District's (MSMVCD; the District) Proposed Program, an analysis of environmental impacts to air quality in the District's Program Area, and mitigation measures for a potentially significant impact. This chapter evaluates Program emissions to determine individual and combined effects in relation to established thresholds of significance. The Proposed Program is the continuation of strategies (alternatives) currently employed for mosquito and/or vector control.

10.1 Environmental Setting

State and federal law defines criteria emissions to include the following: reactive organic gases or volatile organic compounds (ROGs or VOCs), nitrogen oxides (NO_X, as nitric oxide [NO] and nitrogen dioxide [NO_2]), carbon monoxide (CO), sulfur dioxide (SO_2), respirable particulate matter (PM_{10}), and fine particulate matter ($PM_{2.5}$). Of these, ROGs and NO_X are precursors to ground-level photochemical ozone (O_3) formation. Elimination of tetraethyl lead in motor gasoline has eliminated lead (Pb) emissions from vehicles and portable equipment, although tetraethyl lead is still used in some types of aviation gasoline.

During applicable mosquito and/or vector control activities, the Program would generate criteria emissions primarily from the combustion of fossil fuels (i.e., gasoline, diesel, jet fuel) used to operate portable equipment, vehicles, and aircraft across the District's Service Area and to a minor extent from chemical treatment applications. (Control activities would also cause greenhouse gas emissions, which are addressed in Chapter 11.)

10.1.1 Program Location

The aggregated Program Area comprises Marin and Sonoma counties for the District's Service Area, and the adjacent counties where control activities may be provided upon request: Yolo, Solano, Lake, and Mendocino. These counties are predominantly in the San Francisco Bay Area Air Basin (SFBAAB), under the jurisdiction of the Bay Area Air Quality Management District (BAAQMD), along with the Northern Sonoma County Air Pollution Control District (NSCAPCD), the Yolo-Solano Air Quality Management District (YSAQMD), the Lake County Air Quality Management District (LCAQMD), and the Mendocino County Air Quality Management District (MCAQMD). The bulk of criteria pollutant emissions resulting from Program activities would occur in the San Francisco Bay Area, and minor amounts would occur in northern Sonoma, Yolo, and Solano counties. The bulk of mosquito and vector control activity emissions would occur in the Bay Area portion of MSMVCD's Service Area (i.e., Marin and Sonoma counties), and only minor amounts would occur in Yolo, Solano, Lake, and Mendocino counties.

Air districts in California are required to monitor air pollutant levels to assure that National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS) are met and, in the event that they are not, to develop strategies to meet these standards. If the standards are met, the local air basin is classified as being in "attainment;" if the standards are exceeded, it is classified as "nonattainment." Where insufficient data exist to make a determination, an area is deemed "unclassified."

The SFBAAB is designated as nonattainment for the state 1-hour, state 8-hour, and federal 8-hour O_3 standards, and nonattainment for all state PM_{10} and $PM_{2.5}$ standards. The SFBAAB is also designated unclassified for the 24-hour federal PM_{10} standard, and nonattainment and attainment for the federal 24-hour and annual $PM_{2.5}$ standards, respectively. For all other pollutants and standards, the SFBAAB is designated as either attainment or unclassified status (BAAQMD 2014; CARB 2013a; USEPA 2013c; see Table 10-2).

Northern Sonoma County is designated attainment for the state 1-hour O_3 standard and unclassified/attainment for the state and federal 8-hour O_3 standards. Yolo-Solano counties are "Serious" nonattainment for the state 1-hour O_3 standard, nonattainment for the state and federal 8-hour O_3 standards, nonattainment for the state 24-hour and annual PM_{10} standards, and partial nonattainment for the federal 24-hour $PM_{2.5}$ standard. Mendocino County is designated nonattainment for the state 24-hour and annual PM_{10} standards. For all other pollutants and standards Mendocino, northern Sonoma, and Yolo-Solano counties are designated either attainment or unclassified status, and Lake County is entirely in attainment or unclassified for all pollutants (CARB 2013a; USEPA 2013c; YSAQMD 2013; MCAQMD 2005).

10.1.2 Meteorology and Climate

The Program Area climate is characterized by moderately wet winters and dry summers. For the region including the MSMVCD, about 90 percent of the annual total rainfall is received in the November through April period. Between June and September, normal rainfall is typically less than 0.6 inch (1.5 centimeters). Temperatures in the Program Area average about 60 degrees Fahrenheit (°F) (15 degrees Celsius [°C]) annually, with average summer highs in the 70 to 80°F (21 to 27°C) range and average winter lows in the 40 to 50°F (4 to 10°C) range. Precipitation averages about 23 inches (58 centimeters) per year, although annual precipitation can vary significantly from year-to-year. Annual average wind speeds in the Program Area are about 8 miles per hour (3.6 meters per second). The predominant direction of air pollution transport in the Program Area is inland from the coastal areas (BAAQMD 2010a; World Climate 2012; NOAA 2008).

10.1.3 Criteria Air Pollutants and Potential Health Impacts

A criteria or regulated air pollutant is any air pollutant for which ambient air quality standards have been set by the USEPA or the California Air Resources Board (CARB). Primary air quality standards are established to protect human (public) health. Secondary air quality standards are designed to protect public welfare from effects such as diminished production and quality of agricultural crops, reduced visibility, degraded soils, materials and infrastructure damage, and damaged vegetation. Criteria pollutants include O_3, NO_2, CO, SO_2, PM_{10}, and $PM_{2.5}$. The six most prevalent criteria pollutants and their potential health effects are described below.

10.1.3.1 Ozone

Ground-level O_3 is a secondary pollutant formed in the atmosphere by a series of complex chemical reactions and transformations in the presence of sunlight above urban areas due to the mixing effects of temperature inversions. Nitrogen oxides (NO_X) and reactive organic gases (ROGs)[1] are the principal constituents in these reactions. NO_X and ROG emissions are predominantly attributed to mobile sources (onroad motor vehicles and other mobile sources). Thus, regulation and control of NO_X and ROGs from these sources is essential to reduce the formation of ground-level O_3.

O_3 is a strong irritating gas that can chemically burn and cause narrowing of airways, forcing the lungs and heart to work harder to provide oxygen to the body. A powerful oxidant, O_3 is capable of destroying organic matter, including human lung and airway tissue; it essentially burns through cell walls. O_3 damages cells in the lungs, making the passages inflamed and swollen. O_3 also causes shortness of breath, nasal congestion, coughing, eye irritation, sore throat, headache, chest discomfort, breathing pain, throat dryness, wheezing, fatigue, and nausea. It can damage alveoli, the individual air sacs in the lungs where oxygen and carbon dioxide are exchanged. O_3 has been associated with a decrease in resistance to infections. People most likely to be affected by O_3 include the elderly, the young, and athletes. O_3 may pose its worst health threat to people who already suffer from respiratory diseases such as asthma, emphysema, and chronic bronchitis (VCAPCD 2003).

[1] Also referred to as reactive organic compounds (ROCs) or VOCs.

10.1.3.2 Nitrogen Dioxide

NO_2 is formed in the atmosphere primarily by the rapid reaction of the colorless gas NO with atmospheric oxygen. It is a reddish brown gas with an odor similar to that of bleach. NO_2 participates in the photochemical reactions that result in O_3. The greatest source of NO, and subsequently NO_2, is the high-temperature combustion of fossil fuels such as in motor vehicle engines and power plant boilers. NO_2 and NO are referred to collectively as NO_X. NO_2 can irritate and damage the lungs, cause bronchitis and pneumonia, and lower resistance to respiratory infections such as influenza. Researchers have identified harmful effects, similar to those caused by O_3, with progressive changes over 4 hours of exposure causing impaired pulmonary function, increased incidence of acute respiratory disease, and difficult breathing for both bronchitis sufferers and healthy persons (VCAPCD 2003).

10.1.3.3 Carbon Monoxide

CO is a common, colorless, odorless, highly toxic gas. It is produced by natural and anthropogenic (caused by human activity) combustion processes. The major source of CO in urban areas is incomplete combustion of carbon-containing fuels (primarily gasoline, diesel fuel, and natural gas). However, it also results from combustion processes including forest fires and agricultural burning. Ambient CO concentrations are generally higher in the winter, usually on cold, clear days and nights with little or no wind. Low wind speeds inhibit horizontal dispersion, and surface inversions inhibit vertical mixing. Traffic-congested intersections have the potential to result in localized high CO levels.

When inhaled, CO does not directly harm the lungs. The impact from CO is on oxygenation of the entire body. CO combines chemically with hemoglobin, the oxygen-transporting component of blood, which diminishes the ability of blood to carry oxygen to the brain, heart, and other vital organs. Red blood cells have 220 times the attraction for CO as for oxygen. This affinity interferes with movement of oxygen to the body's tissues. Effects from CO exposure include headaches, nausea, and death. People with heart ailments are at risk from low-level exposure to CO. Also sensitive are people with chronic respiratory disease, the elderly, infants and fetuses, and people suffering from anemia and other conditions that affect the oxygen-carrying capacity of blood. High CO levels in a concentrated area can result in asphyxiation. Studies show a synergistic effect when CO and O_3 are combined (VCAPCD 2003).

10.1.3.4 Sulfur Dioxide

SO_2 is a colorless gas with a sharp, irritating odor. It can react in the atmosphere to produce sulfuric acid and sulfates, which contribute to acid deposition and atmospheric visibility reduction. It also contributes to the formation of PM_{10}. Most of the SO_2 emitted into the atmosphere is from burning sulfur-containing fossil fuels by mobile sources such as marine vessels and farm equipment and stationary fuel combustion. SO_2 irritates the mucous membranes of the eyes and nose and may also affect the mouth, trachea, and lungs. Healthy people may experience sore throats, coughing, and breathing difficulties when exposed to high concentrations. SO_2 causes constriction of the airways and poses a health hazard to asthmatics, which are very sensitive to SO_2. Children often experience more respiratory tract infections when they are exposed to SO_2 (VCAPCD 2003).

10.1.3.5 Respirable Particulate Matter, 10 Microns

PM_{10} consists of particulate matter, fine dusts and aerosols, 10 microns or smaller in diameter. When inhaled, particles larger than 10 microns generally are caught in the nose and throat and do not enter the lungs. PM_{10} can enter the large upper branches of the lungs just below the throat, where they are caught and removed (by coughing, spitting, or swallowing).

The primary sources of PM_{10} include dust from paved and unpaved roads and construction and demolition operations. Lesser sources of PM_{10} include wind erosion, agricultural operations, residential wood combustion, smoke, tailpipe emissions, and industrial sources. These sources have different constituents, and, therefore, varying effects on health. Road dust is composed of many particles other

than soil dust. It also includes engine exhaust, tire rubber, oil, and truckload spills. Diesel particulate matter (DPM) contains many toxic particle and elemental carbon (soot), and is considered a toxic air contaminant in California. Airborne particles absorb and adsorb toxic substances and can be inhaled and lodge in the lungs. Once in the lungs, the toxic substances can be absorbed into the bloodstream and carried throughout the body. PM_{10} concentrations tend to be lower during the winter months because weather greatly affects PM_{10} concentrations. During rain, concentrations are relatively low, and on windy days, PM_{10} levels can be high. Photochemical aerosols, formed by chemical reactions with man-made emissions, may also influence PM_{10} concentrations.

Elevated ambient particulate levels are associated with premature death, an increased number of asthma attacks, reduced lung function, aggravation of bronchitis, respiratory disease, cancer, and other serious health effects. Short-term exposure to particulates can lead to coughing, minor throat irritation, and a reduction in lung function. Long-term exposure can be more harmful. The USEPA estimates that 8 percent of urban nonsmoker lung cancer risk is due to PM_{10} in soot from diesel trucks, buses, and cars. Additional studies by the USEPA and the Harvard School of Public Health estimate that 50,000 to 60,000 deaths per year in the US are caused by particulates. PM_{10} particles collect in the upper portion of the respiratory system, affecting the bronchial tubes, nose, and throat. They contribute to aggravation of asthma, premature death, increased number of asthma attacks, bronchitis, reduced lung function, respiratory disease, aggravation of respiratory and cardiovascular disease, alteration of lung tissue and structure, changes in respiratory defense mechanisms, and cancer (VCAPCD 2003).

10.1.3.6 Fine Particulate Matter, 2.5 Microns

$PM_{2.5}$ is a mixture of particulate matter, fine dusts, and aerosols 2.5 microns or smaller in aerodynamic diameter. $PM_{2.5}$ can enter the deepest portions of the lungs where gas exchange occurs between the air and the blood stream. They are the most dangerous particles because the lungs have no efficient mechanisms for removing them. If these particles are soluble in water, they pass directly into the blood stream within minutes. If they are not soluble in water, they are retained deep in the lungs and can remain there permanently. This tendency increases the risks of long-term disease including chronic respiratory disease, cancer, and increased and premature death. Other effects include increased respiratory stress and disease, decreased lung function, alterations in lung tissue and structure, and alterations in respiratory tract defense mechanisms.

$PM_{2.5}$ particles are emitted from activities such as industrial and residential combustion processes, wood burning, and from diesel- and gasoline-powered vehicles. They are also formed in the atmosphere from gases such as SO_2, NO_X, ammonia, and VOCs that are emitted from combustion activities and then become particles as a result of chemical transformations in the air (secondary particles) (VCAPCD 2003).

10.1.4 Relationship of Air Pollution to Asthma

10.1.4.1 Sensitive Receptors

Consistent with the health effects of air pollution described above, certain population groups are considered more sensitive to air pollution and odors than others; in particular, children, elderly, and acutely ill and chronically ill persons, especially those with cardiorespiratory diseases such as asthma and bronchitis. Sensitive receptors (land uses) indicate locations where such individuals are typically found, namely schools, daycare centers, hospitals, convalescent homes, residences of sensitive persons, and parks with active recreational uses, such as youth sports.

Persons engaged in strenuous work or physical exercise also have increased sensitivity to poor air quality. Residential areas are considered more sensitive to air quality conditions than commercial and industrial areas, because people generally spend longer periods of time at their residences, resulting in greater exposure to ambient air quality conditions. Recreational uses such as parks are also considered

sensitive, due to the greater exposure to ambient air quality conditions and because the presence of pollution detracts from the recreational experience.

Due to the wide geographic dispersion of District activities and their short-term temporary nature at any particular location, no quantifiable risk to sensitive receptors or the general public would be posed by Program-related engine exhaust. Since the District does limited adulticiding, which typically disperses particulates in the range of 8 to 20 microns (generally larger than the ambient air quality standard range of 2.5 to 10 microns), engine exhaust is the primary source of $PM_{2.5}$ and PM_{10} emissions from Program activities.

10.1.5 Existing Air Quality

Air quality is affected by a variety of sources in the vicinity of the Program Area. Large stationary sources such as oil refineries and power plants emit substantial amounts of NO_X and ROCs, along with PM_{10} and $PM_{2.5}$. Light motor vehicles, diesel-powered construction equipment, and commercial trucks used in the Program Area are another source of these pollutants. Noncombustion sources of PM_{10} and $PM_{2.5}$ include fugitive dust from roads, construction, demolition, and earthmoving. Finally, commercial and general aviation aircraft generate emissions that affect air quality.

O_3 is a secondary pollutant that is not emitted directly by sources, but rather is formed by a reaction between NO_X and ROCs in the presence of sunlight. Reductions in O_3 concentrations are dependent upon reducing emissions of these precursors. The major sources of O_3 precursors in the Bay Area are motor vehicles and other mobile equipment (including agricultural equipment), solvent use, petroleum industry activities, nonelectric agricultural water pumping, and electric utilities operation.

BAAQMD, NSCAPCD, YSAQMD, MCAQMD, and LCAQMD operate extensive regional air monitoring networks comprised of monitoring stations (sites) that collectively measure the ambient concentrations of six criteria air pollutants: O_3, NO_2, SO_2, CO, PM_{10}, and $PM_{2.5}$. Not all monitoring stations are fully instrumented for these pollutants, while some sites have not been operating for adequate periods of time to provide representative data for characterization of attainment status.

10.1.5.1 Sources of Air Pollutants

The most significant regional sources of O_3, NO_2, and CO in ambient air are automobiles, trucks, and other onroad vehicles, along with trains, vessels, and aircraft. O_3 is not directly emitted; rather, photochemical O_3 is formed by the atmospheric reaction of VOCs and NO_X in sunlight. Gasoline and diesel engines emit VOCs and NO_X as combustion products, as does natural gas-fired equipment (stationary sources) such as pump engines, gas turbine generators, process heaters, and steam boilers.

Local PM_{10} emissions are primarily the result of fugitive dust from travel on unpaved roads, as well as construction and agricultural activities. Coarser particles also may be emitted from activities that disturb the topsoil. Other sources include wind-blown dust, pollen, salts, brake dust, and tire wear. Although $PM_{2.5}$ is a subset of PM_{10}, it differs from the rest of PM_{10}. While most of the ambient PM_{10} results from direct emissions of the pollutant, a significant amount of the ambient $PM_{2.5}$ results from transformation of precursors and condensing of gaseous pollutants in the atmosphere. Other than direct $PM_{2.5}$ emissions, the key pollutants contributing to $PM_{2.5}$ concentrations in the atmosphere are SO_2, NO_X, VOCs, and ammonia (CARB 2005).

Mobile sources used in mosquito and vector control activities include onroad fleet vehicles (light- and medium-duty trucks, vans, passenger cars), offroad ATVs, watercraft (motorboats, airboats), aircraft (helicopters and fixed-wing), portable equipment (pumps, sprayers, generators), and small equipment (handheld sprayers, foggers, dusters). Except for 2-stroke engines used in small lightweight equipment (spark ignition, 50:1 gas/oil mix), engines are 4-stroke gasoline (spark ignition) or diesel fuel (compression ignition). The dominant fuel used for these mobile sources is motor gasoline along with some diesel fuel (larger trucks), aviation gasoline (fixed-wing aircraft), and jet fuel (turbine-powered helicopters). Light

trucks, vans, and passenger cars are normally used for responding to public service requests and vector surveillance.

10.1.5.2 Volatile Organic Compounds

VOCs are present in both indoor and outdoor environments because they are necessary ingredients in industrial and consumer products such as paints, varnishes, sealers, thinners, solvents, adhesives, sealants, and some types of pesticides and herbicides. Outdoors, VOCs are released into the air mainly during manufacture or use of such products. Indoors, in addition to interior painting, VOCs are released into the air mainly from the use of household and janitorial products. VOCs are of concern as both indoor and outdoor air pollutants; however, the concerns are different. Indoors, the main concern is human health impacts. Outdoors, air districts and the USEPA regulate VOCs mainly because they contribute – along with NO_X – to the formation of photochemical ozone.

> The USEPA, per 40 Code of Federal Regulations (CFR) 51.100(s), defines VOCs as any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions, except those designated by the USEPA as having negligible photochemical reactivity (USEPA 2009c).

> Scientific literature generally defines VOCs as organic chemical compounds whose composition makes it possible for them to evaporate under normal atmospheric conditions of temperature and pressure. The volatility of an organic compound is inversely proportional to its boiling point (BP), i.e., the lower the BP, the higher its volatility (USEPA 2014).

The European Union (2004) defines a VOC as any organic compound having an initial BP less than or equal to 482°F (250°C) measured at standard atmospheric pressure at sea level (760 millimeters mercury or 14.7 pounds per square inch absolute). The World Health Organization (1989) categorizes organic pollutants as very volatile, volatile, and semivolatile. Very volatile organic compounds (VVOCs) are so volatile that they typically exist as gases rather than being present in materials. Semivolatile organic compounds (SVOCs) and particulate organic matter (POM) constitute very small fractions of the total amount of organic pollutants found in air, mainly because they are liquids or solids at ambient temperature. Between VVOCs and SVOCs are VOCs, which include several common species of organic pollutants. The four broad categories of organic air pollutants are described below (WHO 1989; Underwriter Laboratories 2012):

> Very volatile organic compounds (VVOCs) have BPs less than 122°F (50°C), most are gases at ambient temperature, and include compounds such as propane, butane, pentane, formaldehyde, acetaldehyde, and methyl chloride (chloromethane). Of these, formaldehyde and acetaldehyde are present in gasoline and diesel engine exhaust.

> Volatile organic compounds (VOCs) have BPs in the range to 122 to 482°F (50 to 250°C) and include compounds such as hexane, benzene, toluene, ethylbenzene, xylenes (collectively referred to as BTEX), acetone, methyl alcohol (methanol), ethyl alcohol (ethanol), and isopropyl alcohol (2-propanol or isopropanol). Compounds such as BTEX are present in gasoline and diesel engine exhaust.

> Semivolatile organic compounds (SVOCs) have BPs in the range of 482 to 716°F (250 to 380°C) and include compounds such as polycyclic aromatic hydrocarbons (PAHs), pesticides (e.g., chlordane), plasticizers (e.g., phthalates), and fire retardants (e.g., polychlorinated biphenyls, polybrominated biphenyls). Diesel Particulate Matter (DPM) in diesel engine exhaust contains compounds such as PAHs.

> Particulate organic matter (POM) has BPs greater than 716°F (380°C) and includes the heavier compounds of DPM, which are essentially nonvolatile in the ambient environment.

In addition, petroleum middle distillates have BPs in the range of 300 to 700°F (150 to 370°C) – between VOCs and SVOCs – and include common fuels such as kerosene (BP 150 to 275°C), diesel fuel (BP 150 to 370°C), and aviation jet fuels (initial BP 175°C). In certain applications, which are not common, kerosene may be used as a carrier solvent for some types of pesticides and herbicides. However, due to its relatively low volatility, kerosene does not evaporate readily at ambient temperatures.

In California and the United States, VOC emissions to the outdoors are regulated by air districts (e.g., BAAQMD) and the USEPA mainly to reduce the formation of ozone, a constituent of photochemical smog. However, not all VOCs are considered photochemically reactive. VOCs that are nonreactive or of negligible reactivity are exempted from the definition of VOCs used by air districts and the USEPA (2009c). Since California has 35 air districts – including the BAAQMD – the specific definition of VOCs can change somewhat depending on jurisdiction. (USEPA 2014)

The USEPA formerly defined the regulated organic compounds in outdoor air as reactive organic gases (ROGs), while some air districts adopted the term reactive organic compounds (ROCs). These terminologies clarified the meanings as being limited to photochemically reactive compounds. However, the USEPA later changed its terminology to VOCs to include substances that may not be reactive but could be harmful to human health in high enough concentrations, particularly indoors. Reducing VOCs indoors and outdoors is an important health and environmental goal. However, VOCs that may be of health risk concern do not impact photochemical reactions and, therefore, are not regulated by the USEPA or air districts (42 USC 7401 et seq. 1970).

As described above, the primary sources of VVOC and VOC emissions from mosquito abatement and vector control activities are from gasoline and diesel engines used to power application equipment and transport personnel and materials. Also included are aircraft emissions, mainly from turbine-powered helicopters burning jet fuel. Further, SVOC and POM emissions from diesel engines in the form of DPM are of particular concern because PAHs are carcinogenic (BAAQMD 2004; OEHHA 2009). Other SVOCs contained in mosquito abatement and vector control materials would be emitted in relatively minor quantities during application activities compared to engine exhaust and would be neither substantial nor cumulatively considerable (see Section 10.2.2).

10.1.6 Regulatory Framework

The following paragraphs summarize the federal, state, and local agencies and the laws and regulations governing air quality that are provided in Appendix C. It is the practice of the District to work with Service Area jurisdictions and agencies during Program planning to reasonably consider the local environmental protection policies and to conform to the extent required.

10.1.6.1 Standards and Attainment Status

The Clean Air Act of 1970 (CAA, amended 1977 and 1990, 42 USC §7401 et seq.) established NAAQS, and individual states retained the option to adopt more stringent standards and to include other pollution sources. CAAQS tend to be at least as protective as national standards and are often more stringent.

The ambient air quality standards shown in Table 10-1 are intended to protect the public health and welfare and specify the concentration of pollutants (with an adequate margin of safety) to which the public may be exposed without adverse health effects. The standards are designed to protect those segments of the public most susceptible to respiratory distress (known as sensitive receptors), including asthmatics, the very young, the elderly, people weak from other illness or disease, or persons engaged in strenuous work or exercise. Healthy adults can tolerate occasional exposure to air pollution levels somewhat above the ambient air quality standards before adverse health effects are observed.

In general, the San Francisco Bay Area experiences low concentrations of most pollutants when compared to state and federal standards, except for O_3 and particulate matter, for which standards are periodically exceeded. Portions of Sonoma County and Yolo-Solano counties also experience mildly

elevated concentrations of O_3, resulting in state and federal nonattainment designations. The attainment status of the main Bay Area region is shown in Table 10-2.

Table 10-1 Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards		Federal Standards	
		ppmv	µg/m³	ppmv	µg/m³
Ozone (O_3)	1-hour	0.09	177	—	—
	8-hour	0.07	137	0.075	147
Nitrogen Dioxide (NO_2)	1-hour	0.18	338	0.100	188
	Annual	0.03	56	0.053	100
Sulfur Dioxide (SO_2)	1-hour	0.25	655	0.075	196
	3-hour Secondary	—	—	0.50	1,309
	24-hour	0.04	105	—	—
	Annual	—	—	0.03	79
Carbon Monoxide (CO)	1-hour	20	22,898	35	40,071
	8-hour	9	10,304	9	10,304
	Lake Tahoe (8-hr)	6	6,869	—	—
Particulates (as PM_{10})	24-hour	—	50	—	150
	Annual	—	20	—	—
Particulates (as $PM_{2.5}$)	24-hour	—	—	—	35
	Annual Primary	—	12	—	12
	Annual Secondary	—	—	—	15
Lead (Pb)	30-day	—	1.5	—	—
	3-month (rolling)	—	—	—	0.15
Sulfates (as SO_4)	24-hour	—	25	—	—
Hydrogen Sulfide (H_2S)	1-hour	0.03	42	—	—
Vinyl Chloride (C_2H_3Cl)	24-hour	0.01	26	—	—
Visibility Reducing Particles	8-hour	Extinction coefficient of 0.23 per kilometer; visibility of 10 miles or more (0.07 to 30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent.		—	—

Sources: BAAQMD 2014; CARB 2013b

ppmv = part(s) per million by volume
µg/m³ = microgram(s) per cubic meter

The 1.5 µg/m³ federal quarterly lead standard applied until 2008; 0.15 µg/m³ rolling 3-month average thereafter For gases, µg /m³ calculated from ppmv based on molecular weight and standard conditions. Standard Temperature 25°C. Standard Molar Volume 24.465 liter/g-mole

Table 10-2 Attainment Status Summary - Bay Area Region

Criteria Pollutant	State Designation	Federal Designation
Ozone (O_3) (1-hour)	Nonattainment	—
Ozone (O_3) (8-hour)	Nonattainment	Nonattainment(1)
Nitrogen Dioxide (NO_2) (1-hour)	Attainment	Unclassified(2)
Nitrogen Dioxide (NO_2) (annual)	Attainment	Attainment
Sulfur Dioxide (SO_2)	Attainment	Attainment
Carbon Monoxide (CO)	Attainment	Attainment
Resp. Particulates (as PM_{10}) (24-hour)	Nonattainment	Unclassified(2)
Resp. Particulates (as PM_{10}) (annual)	Nonattainment	—
Fine Particulates (as $PM_{2.5}$) (24-hour)	—	Nonattainment
Fine Particulates (as $PM_{2.5}$) (annual)	Nonattainment	Attainment
Lead (Pb)	Attainment	Attainment
Sulfates (as SO_4)	Attainment	—
Hydrogen Sulfide (H_2S)	Unclassified(2)	—
Vinyl Chloride (C_2H_3Cl)	ND	—
Visibility	Unclassified(2)	—

Sources: BAAQMD 2014; CARB 2013a

ND = no data/information available

Notes:

(1) The 0.08 ppmv federal 8-hour O_3 standard applied until 2008; 0.075 ppmv thereafter

(2) At the time of designation, if the available data do not support a designation of attainment or nonattainment, the area is designated as unclassified.

10.1.6.2 Federal Authority

The 1977 CAA amendments required that regional planning and air pollution control agencies prepare regional air quality plans to outline the measures by which both stationary and mobile sources of pollutants can be controlled to achieve all standards by the deadlines specified in the act.

For the SFBAAB, the Association of Bay Area Governments, the Metropolitan Transportation Commission, and BAAQMD jointly prepared the *2005 Bay Area Ozone Strategy* (2005), which provided inputs to the most recent *2010 Clean Air Plan* (2010b) issued by BAAQMD. These plans contain control strategies that demonstrate attainment with NAAQS by the deadlines established in the federal CAA and become part of the State Implementation Plan (SIP) administered by CARB and submitted to USEPA. Similarly, NSCAPCD, YSAQMD, and MCAQMD are also required to prepare and submit tailored clean air implementation plans to state and federal regulators.

Under the 1990 CAA amendments, areas that did not meet the original federal 1-hour O_3 standard were classified according to the severity of each area's respective O_3 problem. The 1-hour classifications were Marginal, Moderate, Serious, Severe, and Extreme.

10.1.6.3 State Authority

In 1988, the California legislature passed the California CAA (California Health and Safety Code Section 39600 et seq.), which, like its federal counterpart, called for designations of areas as attainment or nonattainment based on state rather than federal standards.

Similar to the federal CAA, the California CAA also classifies areas according to pollution levels. Under the California CAA, the Bay Area is a "Serious" O_3 nonattainment area and state PM_{10} and $PM_{2.5}$ nonattainment areas. In addition, localized CO concentrations, also known as CO "hotspots," may occur at heavily traveled roadways, particularly at intersections or other locations where the traffic is congested and vehicles idle for prolonged periods. CO concentrations exceeding the existing standard may occur at intersections that operate at a Level of Service D or worse.

CARB is the state agency responsible for regulating air quality, and its responsibilities include establishing CAAQS, emissions standards, and regulations for mobile emissions sources (e.g., autos, trucks, etc.) as well as overseeing the efforts of countywide and multicounty air pollution control districts, which have primary responsibility over stationary sources. The emission standards most relevant to the Program are those related to automobiles, light- and medium-duty trucks, and California heavy-duty truck and construction equipment engines.

10.1.6.4 Local Authority

BAAQMD is the regional agency responsible for air quality regulation within the San Francisco Bay Area along with NSCAPCD, YSAQMD, MCAQMD, and LCAQMD in their respective jurisdictions. Air quality is regulated through planning, monitoring, rulemaking, permitting, and enforcement activities. Districts have permit authority over most types of stationary emission sources and can require stationary sources to obtain permits; they can also impose emission limits, set fuel or material specifications, or establish operational limits to reduce air emissions. BAAQMD also regulates new or expanding stationary sources of toxic air contaminants. For state air quality planning purposes, the Bay Area is classified by the California CAA as a nonattainment area for O_3. The "Serious" classification triggers various plan submittal requirements and transportation performance standards. One such requirement is that each district update its air quality attainment plan every 3 years (triennially) to reflect progress in meeting the air quality standards and to incorporate new information regarding the feasibility of control measures and new emission inventory data. Districts indirectly regulate construction projects that use mobile sources via the statewide Portable Equipment Registration Program (PERP) discussed below. Since the Program does not meet the definition of permanent stationary sources, no permits would be required from the BAAQMD, NSCAPCD, YSAQMD, MCAQMD, or LCAQMD.

10.1.6.5 Source-Specific Regulations

10.1.6.5.1 Nonroad Engine Standards

CARB regulates mobile sources of air pollution in the State of California. Self-propelled nonroad construction equipment is considered a vehicle, as defined by the California Vehicle Code. A vehicle may have an engine that both propels the vehicle and powers equipment mounted on the vehicle. As such, vehicles are generally exempt from regulation by the air districts. However, not included in exemption provisions is any equipment mounted on a vehicle that would otherwise require a permit under air district rules and regulations.

Federal Tier 1 standards for offroad diesel engines were adopted as part of the California requirements for 1995. Federal Tier 2 and Tier 3 standards were adopted in 2000 and selectively apply to the full range of diesel offroad engine power categories. Both Tier 2 and Tier 3 standards include durability requirements to ensure compliance with the standards throughout the useful life of the engine (40 CFR 89.112, 13 California Code of Regulations [CCR] 2423).

On May 11, 2004, the USEPA signed the final rule implementing Tier 4 emission standards, which are to be phased-in over the period of 2008 to 2015 (69 Federal Register 38957-39273, 29 June 2004). The Tier 4 standards require that PM and NO_X emissions be further reduced by about 90 percent. Such emission reductions can be achieved through the use of advanced control technologies – including advanced exhaust gas after treatment similar to those required by the 2007–2010 standards for highway diesel engines.

10.1.6.5.2 Portable Equipment Registration Program

The statewide PERP establishes a uniform program to regulate portable engines and portable engine-driven equipment units. Once registered in PERP, engines and equipment units may operate throughout California without the need to obtain individual permits from local air districts such as BAAQMD, NSCAPCD, YSAQMD, MCAQMD, and LCAQMD. Owners or operators of portable engines and certain types of equipment can register their units under the PERP to operate their equipment anywhere in the state. (CARB 2012a)

BAAQMD operates stipulated enforcement programs for owners and operators of portable equipment, which does not comply with CARB's Portable Diesel Airborne Toxic Control Measure (ATCM) regulation. Under this rule, any portable diesel engine not registered in the PERP prior to January 1, 2006, is illegal, and may not be operated in California unless it meets the ATCM Tier requirements or has an operating permit issued by an air district.

BAAQMD Regulation 2, Sections 2-1-105 and 2-1-114 list types of portable equipment commonly used in construction as exempt from stationary source rule requirements provided that the equipment complies with all applicable requirements of the statewide PERP pursuant to 13 CCR, Division 3, Chapter 3, Article 5. The District's Proposed Program is not subject to BAAQMD permitting requirements because the Program would not involve any stationary air pollution sources that are subject to BAAQMD review, including engine-driven pumps, generators, and air compressors.

10.1.6.5.3 Air Toxics Control Measures

On July 26, 2007, CARB adopted a regulation to reduce DPM and NO_X emissions from in use (existing) offroad heavy-duty diesel vehicles in California. Such vehicles are used in construction, mining, and industrial operations. Not included in this category are locomotives, commercial marine vessels, marine engines over 50 horsepower, or recreational vehicles. The ATCM regulation supplements existing tiered emission standards for nonroad diesel engines in California (CARB 2012b).

10.1.6.5.4 Senate Bill 656

Senate Bill 656 is a planning requirement that calls for a plan and strategy for reducing $PM_{2.5}$ and PM_{10}. This bill requires CARB to identify, develop, and adopt a list of control measures to reduce the $PM_{2.5}$ and PM_{10} emissions from new and existing stationary, mobile, and area sources. BAAQMD has developed particulate matter control measures and submitted plans to CARB that include lists of measures to reduce particulate matter. Under the plans, air districts are required to continue to assess $PM_{2.5}$ and PM_{10} emissions and their impacts.

For construction emissions of fugitive PM_{10}, California air districts have adopted a number of feasible control measures that can be reasonably implemented to significantly reduce fugitive PM_{10} emissions from construction. In general, most districts' approach to CEQA analyses of construction impacts is to emphasize implementation of effective and comprehensive control measures rather than detailed quantification of emissions.

10.1.6.5.5 Nuisance (Odors)

BAAQMD CEQA Air Quality Guidelines (BAAQMD 2011) require an assessment of a project's potential to cause a public nuisance by subjecting surrounding land uses (receptors) to objectionable odors. Due to proximity, NSCAPCD and YSAQMD generally follow the BAAQMD guidelines (NSCAPCD 2012; YSAQMD 2013).

Nuisance is a fundamental air pollution control rule across the state in all air districts, including NSCAPCD Rule 400 and YSAQMD Rule 2.5, and typically contain the same language as BAAQMD Regulation 1, Rule 301 which states that "No person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance or annoyance to any considerable number of persons or the public; or which endangers the comfort, repose, health or safety of any such persons or the public, or which causes, or has a natural tendency to cause, injury or damage to business or property."

BAAQMD Regulation 7, Rule 102 defines an objectionable odor problem as when the Air Pollution Control Officer "receives odor complaints from ten or more complainants within a 90-day period, alleging that a person has caused odors perceived at or beyond the property line of such person and deemed to be objectionable by the complainants in the normal course of their work, travel, or residence." The assessment protocol includes projects that have the potential to cause odors or projects that may subject potential sensitive receptors to nearby existing or proposed land uses that emit objectionable odors.

Some of the pesticides used for mosquito control have an unpleasant odor in concentrated form, in particular the Bti liquids and the adulticides pyrethrin and permethrin. Bti liquids, when diluted with water and sprayed onto water containing breeding mosquitoes, have almost no odor within a few minutes of application. The adulticides pyrethrin and permethrin have no residual smell once the ULV fog dissipates (about 20 minutes maximum). The BVA-2 oil has an odor, although once applied (3 to 5 gallons per acre) not much odor remains.

10.1.6.5.6 Toxic Air Contaminants

A project with the potential to expose sensitive receptors (including residential areas) or the general public to substantial levels of toxic air contaminants, as designated by CARB under 17 CCR 93001, listed in BAAQMD's Toxic Air Contaminants Inventory (BAAQMD 2004), would be deemed to have a significant impact. Projects that would locate receptors near existing sources of toxic air contaminants are included, as well as projects that would place sources of toxic air contaminants near existing receptors.

Projects that have the potential to expose the public to toxic air contaminants in excess of the following thresholds would be considered to have a significant air quality impact for receptors within 1,000 feet of a source boundary. These thresholds, which are based on the 2010/2011 BAAQMD CEQA Air Quality Guidelines (BAAQMD 2011), are as follows:

> Probability of contracting cancer for the Maximally Exposed Individual (MEI) that exceeds 10 in 1 million. The MEI is a hypothetical person exposed for 70 years continuously (24 hours per day, 365 days per year).

> Ground-level concentrations of chronic or acute noncarcinogenic toxic air contaminants that result in a Hazard Index greater than 1 for the MEI.

> Ambient $PM_{2.5}$ increase greater the 0.3 $\mu g/m^3$ on an annual average basis.

DPM is considered a toxic air contaminant in California (Section 93000). Due to the limited use of diesel-powered vehicles and equipment and the Program's wide geographic scope, DPM emissions would not be sufficient to pose a significant risk to sensitive receptors from mosquito and/or vector control equipment operations.

10.1.6.5.7 General Conformity

A General Conformity determination is required for federally sponsored, permitted, or funded actions in NAAQS nonattainment areas or in certain maintenance areas when the total direct and indirect net emissions of nonattainment pollutants (or their precursors) exceed specified thresholds (CAA Amendments of 1990 Section 176[c]). This regulation ensures that federal actions conform to SIPs and agency NAAQS attainment plans.

As discussed in Section 10.1.6 and shown in Table 10-2, the Bay Area region is in federal nonattainment for $PM_{2.5}$ and O_3. Thus, the emissions of nonattainment pollutants NO_X, VOCs, PM_{10}, and $PM_{2.5}$ would be subject to the Rule if the Program were a federal action. However, since the Program is a local action and not federally sponsored, permitted, or funded action, General Conformity does not apply.

10.2 Environmental Impacts and Mitigation Measures

10.2.1 Evaluation Concerns and Criteria

The environmental concerns are those identified below from the CEQA Guidelines and from public scoping. The public identified the following issues:

> Address impacts of spraying/fogging on air quality for humans and pets alike.

> Address impacts of emissions of air pollutants from control and treatment methods and combustion of fuels.

The focus in this chapter is on the use of equipment to perform all Program activities and the resulting emissions impacts to air quality. Concerning the chemical treatment methods, the effects of applications of those specific chemicals is addressed in Section 6.2 for ecological health and Section 7.2 for human health. The CEQA Guidelines cover the issues from public scoping.

10.2.1.1 Standards of Significance

The PEIR addresses the following criteria/standards of significance for air resources as based on CEQA Guidelines Appendix G, *Environmental Checklist Form*, Section III. Would the project:

> Conflict with or obstruct implementation of the applicable Air Quality Attainment Plan or Congestion Management Plan?

> Violate any stationary source air quality standard or contribute to an existing or projected air quality violation?

> Result in a net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors)?

> Expose sensitive receptors to substantial pollutant concentrations?

> Create objectionable odors affecting a substantial number of people?

For this Program, determinations made with respect to significance criteria are documented in Sections 10.2.3 through 10.2.8.

10.2.1.1.1 BAAQMD CEQA Guidelines

On June 2, 2010, the BAAQMD Board adopted a significant update to its December 1999 *CEQA Air Quality Guidelines*. BAAQMD subsequently issued clarifications and minor edits to the June 2010 Guidelines. The revised *CEQA Air Quality Guidelines* is a guidance document to provide lead government agencies, consultants, and project proponents with uniform procedures for assessing air quality impacts and preparing the air quality sections of environmental documents for projects subject to CEQA. The document describes the criteria that BAAQMD uses when reviewing and commenting on the adequacy of environmental documents. It recommends quantitative thresholds for use in determining whether construction and operational activities associated with projects would have significant adverse environmental impacts, identifies methodologies for predicting project emissions and impacts, and identifies measures that can be used to avoid or reduce air quality impacts. (BAAQMD 2011, 2012a)

However, due to a legal challenge,[2] the adopted 2011 Guidelines and significance thresholds (BAAQMD 2011) are no longer officially in effect. Per the revised and adopted 2012 Guidelines (BAAQMD 2012a), lead agencies have the discretion to use either the adopted 1999 thresholds or the more stringent 2010/2011 thresholds.[3] At MSMVCD's request, the air quality analysis will follow the 2010/2011 significance thresholds because MSMVCD has determined that Appendix D of the Guidelines, in combination with BAAQMD's Revised Draft Options and Justification Report (BAAQMD 2009), provides substantial evidence to support the 2010/2011 significance thresholds and, therefore, has determined they are appropriate for use in this analysis in lieu of the 1999 significance thresholds.

For the PEIR, air quality impacts will be quantitatively assessed using significance thresholds established by BAAQMD in its 2010/2011 CEQA Guidelines for nonattainment pollutants and USEPA for attainment pollutants, which are listed in Table 10-3. Federal Prevention of Significant Deterioration thresholds contained in 40 CFR 51.166(b)(23)(i) applicable to NSCAPCD are also higher than BAAQMD thresholds. The 2010/2011 BAAQMD thresholds are the most stringent (lowest) quantitative criteria for assessing the potential for all Program impacts under CEQA.

[2] On March 5, 2012, Alameda County Superior Court issued a judgment finding that BAAQMD had failed to comply with CEQA when it adopted the Thresholds. The court did not determine whether the Thresholds were valid on the merits, but found that the adoption of the Thresholds was a project under CEQA. The court issued a writ of mandate ordering BAAQMD to set aside the Thresholds and cease dissemination of them until BAAQMD had complied with CEQA. BAAQMD has appealed the Alameda County Superior Court's decision. The Court of Appeal of the State of California, First Appellate District, reversed the trial court's decision. The Court of Appeal's decision was appealed to the California Supreme Court, which granted limited review, and the matter is currently pending there.

[3] Due to the March 5, 2012, writ of mandate, which sets aside BAAQMD's adopted 2010 CEQA Thresholds of Significance, BAAQMD cannot recommend specific thresholds of significance for use by local governments at this time (October 2014). Lead agencies will need to determine appropriate air quality thresholds to use for each project they review based on substantial evidence that they should include in the administrative record for the project. Lead agencies should examine the substantial evidence in determining appropriate air quality thresholds. Lead agencies may reference BAAQMD's 1999 Thresholds of Significance. Lead agencies may also reference BAAQMD's CEQA Thresholds Options and Justification Report developed by staff in 2009. The CEQA Thresholds Options and Justification Report outlines substantial evidence supporting a variety of thresholds of significance. In accordance with the court order referenced above, the Air District cannot and does not endorse or recommend any of the particular thresholds outlined therein.

Table 10-3 CEQA Significance Thresholds - BAAQMD (2010/2011)[1]

Criteria Pollutants, Precursors, GHGs, Risks and Odors	Construction lbs/day	Operation	
		lbs/day	tons/yr
Reactive Organic Gases (ROGs)	54	54	10
Nitrogen Oxides (NO_X)	54	54	10
Sulfur Dioxide (SO_2)[2]	None	None	40
PM_{10} (exhaust)	82	82	15
$PM_{2.5}$ (exhaust)	54	54	10
PM_{10} / $PM_{2.5}$ (fugitive dust)[3]	BMPs	None	
Local Carbon Monoxide (CO)[4]	None	CAAQS: 9 ppmv (8-hr); 20 ppmv (1-hr)	
GHGs - Stationary Sources	None	10,000 MT CO_2e/year	
GHGs - Other than Stationary Sources	None	Compliance with GHG Reduction Strategy OR 1,100 MT of CO_2e/yr OR 4.6 MT CO_2e/SP/yr (res + emp)	
Risks & Hazards (individual project)	Compliance with Community Risk Reduction Plan OR Increased cancer risk of >10.0 in a million; Increased noncancer risk of >1.0 Hazard Index (Chronic or Acute); Ambient $PM_{2.5}$ increase: >0.3 µg/m^3 annual average		
Risks & Hazards (cumulative threshold)	Compliance with Community Risk Reduction Plan OR Increased cancer risk of >100.0 in a million; Increased noncancer risk of >10.0 Hazard Index (Chronic or Acute); Ambient $PM_{2.5}$ increase: >0.8 µg/m^3 annual average		
Accidental Release of Acutely Hazardous Air Pollutants/Materials	None	Storage or use of acutely hazardous materials located near receptors or new receptors locating near stored or used acutely hazardous materials are considered significant	
Odors	None	5 confirmed complaints per year averaged over 3 years	

Source: BAAQMD 2011 (see note 1), 40 CFR 51.166 (see note 2)

Notes:

1 At the request of MSMVCD, the air quality analysis will follow the 2010/2011 draft significance thresholds. This is because MSMVCD has determined that Appendix D of the guidelines, in combination with BAAQMD's Revised Draft Options and Justification Report (BAAQMD 2009), provides substantial evidence to support the 2010 significance thresholds and, therefore, has determined they are appropriate for use in this analysis in lieu of the 1999 significance thresholds.

2 Prevention of Significant Deterioration, annual only

3 BMPs = Best Management Practices for control of fugitive dust

4 Not to exceed California Ambient Air Quality Standards for CO

10.2.2 Evaluation Methods and Assumptions

As described in Section 10.1.5, operation of onroad fleet vehicles, offroad all-terrain vehicles, watercraft, aircraft, portable equipment, and small equipment would result in emissions of criteria pollutants (NO_X, VOCs, CO, SO_X, PM_{10}, $PM_{2.5}$) in engine exhaust. Detailed lists of equipment, estimated usage, and emission calculations are provided in Appendix C, in Attachment A. Equipment lists and annual activity schedules were provided by the District. Emission calculations were performed using the most recent and applicable emission factors published by CARB (2008a), Hare and Springer 1973, and USEPA (1991d, 2011a, 2011b, 2012a).

From Table 2-6 in Section 2.9, the District is implementing BMPs to avoid or minimize environmental impacts from applications of pesticides, surfactants, and/or herbicides (category H) under the Vegetation Management and/or Chemical Control Alternatives. The impact significance determinations assume that the District will continue to implement the following BMPs:

1. District staff will conduct applications with strict adherence to product label directions that include approved application rates and methods, storage, transportation, mixing, and container disposal. (BMP H1)
2. District will avoid use of surfactants when possible in sites with aquatic nontargets or natural enemies of mosquitoes present such as nymphal damselflies and dragonflies, dytiscids, hydrophilids, corixids, notonectids, ephydrids, etc. Surfactants are the only tool that can be used with pupae to prevent adult mosquito emergence. The District will use a microbial larvicide (Bti, Bs) or IGR (e.g., methoprene) instead or another alternative when possible. (BMP H2)
3. Materials will be applied at the lowest effective concentration for a specific set of vectors and environmental conditions. Application rates will never exceed the maximum label application rate. (BMP H3)
4. To minimize application of pesticides, application of pesticides will be informed by surveillance and monitoring of vector populations. (BMP H4)
5. District staff will follow label requirements for storage, loading, and mixing of pesticides and herbicides. Handle all mixing and transferring of herbicides within a contained area. (BMP H5)
6. Postpone or cease application when predetermined weather parameters exceed product label specifications, when wind speeds exceed the velocity as stated on the product label, or when a high chance of rain is predicted and rain is determining factor on the label of the material to be applied. (BMP H6)
7. Applicators will remain aware of wind conditions prior to and during application events to minimize any possible unwanted drift to waterbodies, and other areas adjacent to the application areas. (BMP H7)
8. Spray nozzles will be adjusted to produce larger droplet size rather than smaller droplet size. Use low nozzle pressures where possible (e.g., 30 to 70 pounds per square inch). Keep spray nozzles within a predetermined maximum distance of target weeds (e.g., within 24 inches of vegetation for hand application) or vectors. Adjusting droplet size would only apply to larvicides, herbicides, and non-ULV applications. Use ULV applications that are calibrated to be effective and environmentally compatible at the proper droplet size (about 10 to 30 microns). (BMP H8)
9. Clean containers at an approved site and dispose of at a legal dumpsite or recycle in accordance with manufacturer's instructions if available. (BMP H9)
10. The District will provide notification to the public (24 to 48 hours in advance, if possible) and/or appropriate agency(ies) when applying pesticides or herbicides for large-scale treatments (e.g., fixed-wing aircraft or helicopters) that will occur in close proximity to homes, heavily populated, high traffic,

and sensitive areas. The District infrequently applies or participates in the application of herbicides in areas other than District facilities. (BMP H13)

11. Engine idling times will be minimized either by shutting equipment and vehicles off when not in use or reducing the maximum idling time to 5 minutes. Correct tire inflation will be maintained in accordance with manufacturer's specifications on wheeled equipment and vehicles to prevent excessive rolling resistance. All equipment and vehicles will be maintained and properly tuned in accordance with manufacturer's specifications. All equipment will be checked by a certified visible emissions evaluator if visible emissions are apparent to onsite staff. (BMP A14)

Chapter 8, *Public Services and Hazard Response*, provides additional information on the District's spill prevention and worker safety plans.

10.2.2.1 Emissions from Equipment Use

Table 10-4 shows alternatives' equipment use applicability by percentage as selected by the District: surveillance, physical control, vegetation management, biological control, chemical control, or other nonchemical control. Table 10-5 shows land uses associated with selected alternatives: residential, commercial, industrial, agricultural, and open space.

Table 10-4 Marin/Sonoma Mosquito and Vector Control District's Selected Alternatives Applicability

Surveillance	Physical Control	Vegetation Management	Biological Control	Chemical Control	Other Nonchemical
20%	5%	13%	21%	25%	15%

Sources: Appendix C, Marin-Sonoma Mosquito and Vector Control District

Table 10-5 Land Uses Associated with Selected Alternatives for Marin/Sonoma Mosquito and Vector Control District

Residential	Commercial	Industrial	Agricultural	Open Space
•	•	•	•	•

Sources: Appendix C, Marin-Sonoma Mosquito and Vector Control District

Tables 10-6 through 10-11 show estimated ongoing annual criteria emissions by alternative for the District from vehicle and equipment use. Table 10-12 shows estimated peak daily criteria emissions for applicable alternatives assuming simultaneous operations of all alternatives as a hypothetical and highly unlikely "worst-case" scenario. Table 10-13 shows estimated highest quarterly and average daily criteria emissions for applicable alternatives assuming concurrent operations as "typical case," which is a more likely and realistic scenario.

Table 10-6 Estimated Annual Criteria Emissions for Surveillance Alternative for Marin/Sonoma Mosquito and Vector Control District

VOCs lbs/year	CO lbs/year	NO_X lbs/year	SO_X lbs/year	PM_{10} lbs/year	$PM_{2.5}$ lbs/year
132	2,515	298	3.5	19.5	13.9

Sources: CARB 2008a; Hare and Springer 1973; USEPA 1991b, 2011a, 2011b, 2012a

Table 10-7 Estimated Annual Criteria Emissions for Physical Control Alternative for Marin/Sonoma Mosquito and Vector Control District

VOCs lbs/year	CO lbs/year	NO_X lbs/year	SO_X lbs/year	PM_{10} lbs/year	$PM_{2.5}$ lbs/year
36	689	82	1.0	5.3	3.8

Sources: CARB 2008a; Hare and Springer 1973; USEPA 1991b, 2011a, 2011b, 2012a

Table 10-8 Estimated Annual Criteria Emissions for Vegetation Management Alternative for Marin/Sonoma Mosquito and Vector Control District

VOCs lbs/year	CO lbs/year	NO_X lbs/year	SO_X lbs/year	PM_{10} lbs/year	$PM_{2.5}$ lbs/year
89	1,700	201	2.4	13.2	9.4

Sources: CARB 2008a; Hare and Springer 1973; USEPA 1991b, 2011a, 2011b, 2012a

Table 10-9 Estimated Annual Criteria Emissions for Biological Control Alternative for Marin/Sonoma Mosquito and Vector Control District

VOCs lbs/year	CO lbs/year	NO_X lbs/year	SO_X lbs/year	PM_{10} lbs/year	$PM_{2.5}$ lbs/year
141	2,683	318	3.7	20.8	14.8

Sources: CARB 2008a; Hare and Springer 1973; USEPA 1991b, 2011a, 2011b, 2012a

Table 10-10 Estimated Annual Criteria Emissions for Chemical Control Alternative for Marin/Sonoma Mosquito and Vector Control District

VOCs lbs/year	CO lbs/year	NO_X lbs/year	SO_X lbs/year	PM_{10} lbs/year	$PM_{2.5}$ lbs/year
167	3,168	375	4.4	24.5	17.5

Sources: CARB 2008a; Hare and Springer 1973; USEPA 1991b, 2011a, 2011b, 2012a

Table 10-11 Estimated Annual Criteria Emissions for Other Nonchemical Control/Trapping Alternative for Marin/Sonoma Mosquito and Vector Control District

VOCs lbs/year	CO lbs/year	NO_X lbs/year	SO_X lbs/year	PM_{10} lbs/year	$PM_{2.5}$ lbs/year
99	1,873	222	2.6	14.5	10.3

Sources: CARB 2008a; Hare and Springer 1973; USEPA 1991b, 2011a, 2011b, 2012a

Table 10-12 Estimated Peak Daily Criteria Emissions for Applicable Alternatives - Simultaneous Operations for Marin/Sonoma Mosquito and Vector Control District

VOCs lbs/day	CO lbs/day	NO_X lbs/day	SO_X lbs/day	PM_{10} lbs/day	$PM_{2.5}$ lbs/day
15.3	394.0	44.1	0.5	2.1	1.5

Sources: CARB 2008a; Hare and Springer 1973; USEPA 1991b, 2011a, 2011b, 2012a

Table 10-13 Estimated Highest Quarterly Criteria Emissions for Applicable Alternatives - Concurrent Operations for Marin/Sonoma Mosquito and Vector Control District

VOCs lbs/qtr	CO lbs/qtr	NO_X lbs/qtr	SO_X lbs/qtr	PM_{10} lbs/qtr	$PM_{2.5}$ lbs/qtr
223	4,369	485	6	33	23

Sources: CARB 2008a; Hare and Springer 1973; USEPA 1991b, 2011a, 2011b, 2012a

No annual or daily thresholds (Table 10-3) would be exceeded by the Program based on estimated mobile source (fuel combustion) emissions from existing activities. Due to the very wide spatial and temporal dispersion of the mobile emissions sources across the Service Area, no ambient air quality standards for any pollutant would be violated solely by mosquito and/or vector control activities. The District's combined annual or peak daily emissions would not be significant. Furthermore, emissions from continuation of existing activities under the Proposed Program in comparison to emissions from existing conditions when the NOP was published (May 25, 2012), would be practically zero (i.e., no substantial net change).

10.2.2.2 Emissions from Chemical Use

Examples of the estimated VOC emissions for some of the pesticide products the District uses are illustrated in Table 10-14 below. The table provides the estimated VOC emissions in pounds/acre for the products currently in use and some products proposed for future use. Using the known total acreage of application, the estimated total VOCs in pounds can be calculated for each product's active ingredient. Some of the active ingredients in the products listed have fairly high emission factors. However, even using these conservative use estimates, the VOC contributions are not significant to the ROG (VOC) operational thresholds contained in Table 10-3 of 54 pounds/day and 10 tons/year.

Since total pounds of product used per year is reported to CDPR, the total calculated VOC emissions for each product can be determined from the estimate of active ingredients. Using the CDPR VOC emission templates, the VOCs produced for three reporting years are listed in Table 10-14. Selected examples of four use scenarios are included in Tables 10-15 through 10-18. Each example calculation provided is the highest use year of 2006, 2008, and 2010 to illustrate the minimal impact of these VOCs in the overall potential contribution to total VOCs.

Some compounds are designated as exempt because they are not considered VOCs due to negligible photochemical reactivity. The exempt compounds are specified in 40 CFR 51.100. Products labeled only for nonagricultural uses are often excluded from the regulations. Nonagricultural uses include (a) home use, (b) use in structural pest control, (c) industrial or institutional use, (d) control of an animal pest under the written prescription of a veterinarian, or (e) vector control. All other uses are considered agricultural.

Table 10-14 Marin/Sonoma Mosquito and Vector Control District's Pesticide Use within Its Service Area

Pesticide (units)*	Active Ingredient	Amount of Active Ingredients		
		2006	2008	2010
Herbicides				
> Habitat (gal)	Imazapyr	0.00	0.55	0.00
	VOC lbs	**na**	**0.36**	**na**
> Liberate (gal)	Alcohol ethoxylate	0.00	0.55	0.00
	VOC lbs	**na**	**0.0**	**na**
Larvicides				
> BVA 2 (gal)	Mineral oil	0.00	0.00	681.73
	VOC lbs	**na**	**na**	**na**
> Golden Bear 1111 (gal)	Mineral oil	531.19	892.06	87.66
	VOC lbs	**na**	**na**	**na**
> Agnique MMF (gal)	Alcohol ethoxylate	41.28	29.81	52.33
	VOC lbs	**na**	**na**	**na**
> Agnique MMFG (lbs)	Alcohol ethoxylate	0.00	33.00	0.00
	VOC lbs	**na**	**na**	**na**
> VectoBac 12AS (gal)	Bti	106.6	69.41	83.5
	VOC lbs	**53.43**	**35**	**41.8**
> VectoBac Corncob Granules - BTI (lbs)	Bti	25.09	509.24	770.40
	VOC lbs	**0.93**	**18.8**	**28.5**
> VectoBac Technical Powder (lbs)	Bti	53.54	57.12	3.28
	VOC lbs	**0.0**	**0.0**	**0.0**
> VectoBac WDG (lbs)	Bti	0.00	0.00	14.00
	VOC lbs	**na**	**na**	**0.52**
> VectoLex WSP (lbs)	Bs	18.13	29.16	22.72
	VOC lbs	**0.67**	**1.08**	**0.84**
> VectoLex CG (lbs)	Bs	561	590	974
	VOC lbs	**20.8**	**21.8**	**36.0**
> VectoLex WDG (lbs)	Bs	91.8	153	166
	VOC lbs	**3.37**	**5.66**	**6.14**
> VectoMax CG (lbs)	Bs and Bti	0.00	0.00	974
	VOC lbs	**na**	**na**	**36**
> Altosid Liquid Larvicide (gal)	Methoprene	97.05	18.20	50.20
	VOC lbs	**5.65**	**11.64**	**31.5**
> Altosid Liquid Larvicide SR20 (gal)	Methoprene	0.00	0.00	0.35
	VOC lbs	**na**	**na**	**0.02**
> Altosid Briquets (small) (lbs)	Methoprene	0.3	0.15	0.12
	VOC lbs	**0.1**	**na**	**na**
> Altosid Pellets (lbs)	Methoprene	68	80.4	47
	VOC lbs	**1.3**	**2.27**	**1.33**

Pesticide (units)*	Active Ingredient	Amount of Active Ingredients		
		2006	2008	2010
> Altosid SBG (lbs)	Methoprene	9	6.3	2.7
	VOC lbs	**0.33**	**0.23**	**0.10**
> Altosid Briquets XR (lbs)	Methoprene	16.3	19	17
	VOC lbs	**0.6**	**0.70**	**0.63**
> Altosid XR granules (lbs)	Methoprene	15.92	0.01	0.00
	VOC lbs	**0.59**	**na**	**na**
Adulticides				
> Pyrocide 5% (gal)	Pyrethrin	1.1	0.41	0.81
	VOC lbs	**7.3**	**2.7**	**2.68**
> Scourge 4% + 12% MF (gal)	Resmethrin	0.00	1.83	0.00
	VOC lbs	na	4.12	na
> Zenivex (gal)	Etofenprox	0.00	0.00	0.90
	VOC lbs	**na**	**na**	**1.68**
Other Pesticides				
> Wasp Freeze (can)	Phenothrin	0.38	0.82	0.59
	VOC lbs	**0.0**	**0.0**	**0.0**
> Delta Dust (lbs)	Deltamethrin	1.62	0.06	23.90
	VOC lbs	**na**	**na**	**na**
> Drione Insecticides (lbs)	Pyrethrin	50.63	52.12	27.99
	VOC lbs	**0.77**	**0.80**	**0.43**
Other				
> Mosquito Fish (each)	na	10828	17485	19635
	VOC lbs	**na**	**na**	**na**
> Sand (lbs)	na	1188.81	1271.13	73.00
	VOC lbs	**na**	**na**	**na**
Total lbs	**VOC/yr**	**95.8**	**105.2**	**181.6**
	Tons/yr	**0.048**	**0.053**	**0.091**

Source: Marin/Sonoma Mosquito and Vector Control District, pesticide use reports.

*Unit of measure is for active ingredient used (calculated from total product used and reported) and number of mosquito fish.

na = not applicable

Table 10-15 Example VOC Calculation for VectoLex CG 2010

Product	VECTOLEX CG BIOLOGICAL LARVICIDE
CA Registration #	73049- 20-AA
VOC Emission Potential	3.70
Primary Active Ingredient	BACILLUS SPHAERICUS, SEROTYPE H-5A5B, STRAIN 2362
Formulation Type	GRANULAR/FLAKE
Application Rate	974 lbs
Total VOC Emissions	36.0 lbs

Table 10-16 Example VOC Calculation for Zoecon Altosid Pellets 2008

Product	ZOECON ALTOSID PELLETS
CA Registration #	2724- 448-ZA
VOC Emission Potential	2.82
Primary Active Ingredient	S-METHOPRENE
Formulation Type	GRANULAR/FLAKE
Application Total	80.4 lbs
Total VOC Emissions	2.27 lbs

Table 10-17 Example VOC Calculation for VectoBac 12AS for 2006

Product	VECTOBAC 12AS BIOLOGICAL LARVICIDE
CA Registration #	73049- 38-AA
VOC Emission Potential	5.71
Primary Active Ingredient	BACILLUS THURINGIENSIS, SUBSP. ISRAELENSIS, STRAIN AM 65-52
Formulation Type	SUSPENSION
Application Total	106.6 gallons
Total VOC Emissions	53.43 lbs

Table 10-18 Example VOC Calculation for Drione Powder 2008

Product	DRIONE INSECTICIDE
CA Registration #	432- 992-ZA
VOC Emission Potential	1.53
Primary Active Ingredient	SILICA AEROGEL, PYRETHRIN
Formulation Type	DUST/POWDER
Application Total	52.12 lbs
Total VOC Emissions	0.80 lb

For those compounds not considered exempt, the VOC contribution of most pesticides can be estimated by multiplying the fraction of a pesticide product estimated to be a VOC (its "emission potential") by the amount of that product applied. The results in Table 10-14 include the active ingredients reported by the District for illustration (even though the products are used for nonagricultural, vector control purposes).

For most compounds, determination of the estimated emission value is based on a laboratory analysis, using a standardized method called thermogravimetric analysis.

Each state keeps an inventory of emissions for each region or county. The lists of emission values for most compounds for the State of California measured in counties and regions for many compounds are located at www.cdpr.ca.gov.

Some of the VOCs of interest to the District are included in the list in CDPR's VOC emissions project website (CDPR 2014a, http://www.cdpr.ca.gov/docs/pur/vocproj/vocmenu.htm).

The VOC emission estimates are based on large uncertainties and, therefore, can be used only as an illustration of the possible VOC release. The VOC estimates for the pesticides the District uses are small compared to those illustrated for the vehicle and equipment use for concurrent operations (see Table 10-13). Each of the hundreds of individual pesticides, application rates, combinations of pesticides and surfactants, and application sequences can be used to estimate the VOCs using the calculator template the CDPR provided (CDPR 2014b).

An example of a VOC release calculation illustrates how small the VOC contribution from an application for vector control is compared to those of the equipment categories. Clearly, the contribution to O_3 production via the pesticide and herbicide applications is of interest, but not significant to the total impact of the District's IVMP to overall air quality.

In summary, although most pesticides used in nonagricultural applications do not rise to the level of a significant contribution to the overall VOC loading of the region, some VOC contribution as a result of pesticide applications can be estimated. In the examples above, the methodology used to estimate VOC contribution of selected pesticides (and herbicides) is based on the District's annual reported pesticide use in years 2006, 2008, and 2010. Some examples of the method used to estimate the VOC contribution calculated are illustrated in Tables 10-15 to 10-18. The rates of VOC contribution are nearly linearly dependent on the type of product, application rate (active ingredient/acre/application), and timing. Inspection of the highest total use in ounces/year resulted in the list of potential VOC emissions using the CDPR templates as described above. Clearly the estimates are dependent on timing and total area. These examples illustrate the very low potential production of VOC emissions due to pesticide product use. These total VOC production values are shown in Table 10-14. The reported annual use of the selected herbicides and pesticides and the calculated total VOC emissions from a typical application are listed for 2006, 2008, and 2010 and are based on pesticide use data the District reported to the County Agricultural Commissioners. More recent information on pesticide use by quarter is provided in Appendix B, *Ecological and Human Health Assessment Report*, Attachment A, Tables A21 through A26.

The total VOCs generated by the use of chemical control of undesirable vectors is small (from 95.8 lbs/yr in 2006 to 181.6 lbs/yr in 2010) in comparison to VOC contributions from all forms of equipment and vehicles (less than 664 lbs/year for all alternatives combined to 892 pounds/year based on highest quarterly emissions). Annual thresholds do not apply to estimated emissions shown herein because mosquito and vector control activities do not comprise a stationary source of air contaminants. Even so, VOC contribution from the District's vector control products is less than significant based on the CEQA significance thresholds. Consequently, the focus of the air quality impact analysis below is on transportation and equipment use for all of the Program alternatives.

10.2.3 Surveillance Alternative

The Surveillance Alternative would be a continuation of existing activities the District currently practices using applicable techniques, equipment, vehicles, and watercraft. Surveillance involves monitoring mosquito and/or vector populations and habitat, their disease pathogens, and the human/vector interactions. Field counting/sampling and trapping are common mechanisms for surveillance. The environmental impact concerns are phrased as questions as follows for the Surveillance Alternative.

Conflict with or obstruct implementation of the applicable Air Quality Attainment Plan or Congestion Management Plan?

The emission source categories associated with the Surveillance Alternative include offroad vehicles, onroad vehicles, and watercraft, all of which are mobile sources of nonattainment pollutants NO_X, VOCs, PM_{10}, and $PM_{2.5}$. As discussed in Section 10.1.6, these types of emission sources are included in the SIP emission inventory and required to meet CARB and USEPA nonroad and onroad emission standards applicable on the date of manufacture. Taken together, these conditions establish that the Surveillance Alternative would not conflict with applicable air quality attainment plans.

> **Impact AQ-1:** Based on the general inclusion of Surveillance Alternative emissions in the SIP emission inventory and the compliance with applicable air regulations, the Surveillance Alternative would not conflict with applicable air quality plans. Impacts would be **less than significant** and no mitigation is required**.**

Violate any stationary source air quality standard or contribute to an existing or projected air quality violation?

The Surveillance Alternative has the potential to emit regulated criteria pollutants, including O_3 precursors NO_X and VOCs, CO, SO_2, PM_{10}, and $PM_{2.5}$. Estimated peak daily emissions of each of these pollutants from all alternatives combined in the District are shown in Table 10-12 and are less than the daily thresholds shown in Table 10-3. Annual thresholds do not apply to estimated emissions shown in Table 10-6 because mosquito and vector control activities do not comprise a stationary source of air contaminants. Since mosquito and vector control activities are widely dispersed across a broad geographic area, no violation of CAAQS for CO would occur. Based on estimated peak daily emissions for each criteria pollutant and geographic dispersion, the Surveillance Alternative would not be the sole cause of a violation of either NAAQS or CAAQS.

> **Impact AQ-2:** Based on estimated daily emissions for each criteria pollutant, the Surveillance Alternative would not violate an ambient air quality standard. Impacts would be **less than significant** and no mitigation is required.

Result in a net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors)?

As discussed in Section 10.1.6, the focus of this assessment is on regulated criteria pollutants for which the local air basin is in nonattainment. Nonattainment pollutants include O_3 precursors NO_X and VOCs, PM_{10}, and $PM_{2.5}$. Estimated peak daily emissions of each of these pollutants from all alternatives combined are shown in Table 10-12 and are less than the daily thresholds shown in Table 10-3. Annual thresholds do not apply to estimated emissions shown in Table 10-6 because mosquito and vector control activities do not comprise a stationary source of air contaminants. Based on estimated peak daily emissions for each criteria pollutant and geographic dispersion, the Surveillance Alternative would not result in a cumulatively considerable increase of nonattainment pollutants. Further, as discussed in Section 10.2.2.2, the primary sources of VOC emissions from mosquito abatement and vector control activities are from gasoline, diesel, and turbine engines used to conduct the Program. Other sources of

VOCs from materials would be relatively minor compared to engine exhaust and would be neither substantial nor cumulatively considerable.

> **Impact AQ-3:** Based on estimated daily emissions for each criteria pollutant, the Surveillance Alternative would not result in a cumulatively considerable increase of nonattainment pollutants. Impacts would be **less than significant** and no mitigation is required.

Expose sensitive receptors to substantial pollutant concentrations?

The Surveillance Alternative has the potential to emit regulated criteria pollutants, including O_3 precursors NO_X and VOCs, CO, SO_2, PM_{10}, and $PM_{2.5}$. Estimated peak daily emissions of each of these pollutants from all alternatives combined are shown in Table 10-12 and are less than the daily thresholds shown in Table 10-3. Annual thresholds do not apply to estimated emissions shown in Table 10-6 because mosquito and vector control activities do not comprise a stationary source of air contaminants. Since mosquito and vector control activities use relatively small amounts of diesel fuel (most equipment and vehicles are gasoline-powered), potential DPM emissions would be small, transient in nature, and dispersed over a wide geographic area. Thus, no significant risk to sensitive receptors would occur from DPM emissions (as PM_{10}). Based on estimated peak daily emissions for each criteria pollutant, the Surveillance Alternative would not be the sole cause of a violation of either NAAQS or CAAQS.

> **Impact AQ-4:** Based on the estimated daily emissions for each criteria pollutant, the Surveillance Alternative would not expose sensitive receptors to substantial pollutant concentrations. Impacts would be **less than significant** and no mitigation is required.

Create objectionable odors affecting a substantial number of people?

Certain VOCs, sulfur compounds, and chlorine compounds found in some pesticides, fumigants, and organochlorines emit characteristic odors when they evaporate (volatilize) into air, even at very low concentrations well within safety limits. The human sense of smell (olfactory system) is sensitive to these types of compounds as a warning mechanism, and some individuals are more sensitive than others. The Surveillance Alternative would not apply these types of odorous treatments, because it involves mostly field sampling and trapping activities. Thus, people would not be affected by objectionable odors.

> **Impact AQ-5:** The Surveillance Alternative would not subject people to objectionable odors. **No impact** would occur**.**

10.2.4 Physical Control Alternative

The Physical Control Alternative would be a continuation of existing activities the District currently practices using applicable techniques, equipment, vehicles, and watercraft. This alternative involves managing vector habitat using source control and permanent control methods that do not use biological agents or chemical pesticides, such as ditch maintenance, debris removal in natural channels, and blockage of access points. The environmental impact concerns are phrased as questions as follows for the Physical Control Alternative.

Conflict with or obstruct implementation of the applicable Air Quality Attainment Plan or Congestion Management Plan?

The emission source categories associated with the Physical Control Alternative include small equipment, portable equipment, offroad vehicles, onroad vehicles, and watercraft, all of which are mobile sources of nonattainment pollutants NO_X, VOCs, PM_{10}, and $PM_{2.5}$. As discussed in Section 10.1.6, these types of emission sources are included in the SIP emission inventory, required to meet CARB and USEPA nonroad and onroad emission standards applicable on the date of manufacture, and subject to PERP and ATCM as applicable. Taken together, these conditions establish that the Physical Control Alternative would not conflict with applicable air quality attainment plans.

Impact AQ-6: Based on the general inclusion of Physical Control Alternative emissions in the SIP emission inventory and the compliance with applicable air regulations, the Physical Control Alternative would not conflict with applicable air quality plans. Impacts would be **less than significant** and no mitigation is required.

Violate any stationary source air quality standard or contribute to an existing or projected air quality violation?

The Physical Control Alternative has the potential to emit regulated criteria pollutants, including O_3 precursors NO_X and VOCs, CO, SO_2, PM_{10}, and $PM_{2.5}$. Estimated peak daily emissions of each of these pollutants from all alternatives combined in the District are shown in Table 10-12 and are less than the daily thresholds shown in Table 10-3. Annual thresholds do not apply to estimated emissions shown in Table 10-7 because mosquito and vector control activities do not comprise a stationary source of air contaminants. Since mosquito and vector control activities are widely dispersed across a broad geographic area, no violation of CAAQS for CO would occur. Based on estimated peak daily emissions for each criteria pollutant and geographic dispersion, the Physical Control Alternative would not be the sole cause of a violation of either NAAQS or CAAQS.

Impact AQ-7: Based on estimated daily emissions for each criteria pollutant, the Physical Control Alternative would not violate an ambient air quality standard. Impacts would be **less than significant** and no mitigation is required.

Result in a net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors)?

As discussed in Section 10.1.6, the focus of this assessment is on regulated criteria pollutants for which the local air basin is in nonattainment. Nonattainment pollutants include O_3 precursors NO_X and VOCs, PM_{10}, and $PM_{2.5}$. Estimated peak daily emissions of each of these pollutants from all alternatives combined in the District are shown in Table 10-12 and are less than the daily thresholds shown in Table 10-3. Annual thresholds do not apply to estimated emissions shown in Table 10-7 because mosquito and vector control activities do not comprise a stationary source of air contaminants. Based on estimated peak daily emissions for each criteria pollutant and geographic dispersion, the Physical Control Alternative would not result in a cumulatively considerable increase of nonattainment pollutants. Further, as discussed in Section 10.2.2.2, the primary sources of VOC emissions from mosquito abatement and vector control activities are from gasoline, diesel, and turbine engines used to conduct the Program. Other sources of VOCs from materials would be relatively minor compared to engine exhaust and would be neither substantial nor cumulatively considerable.

Impact AQ-8: Based on estimated daily emissions for each criteria pollutant, the Physical Control Alternative would not result in a cumulatively considerable increase of nonattainment pollutants. Impacts would be **less than significant** and no mitigation is required.

Expose sensitive receptors to substantial pollutant concentrations?

The Physical Control Alternative has the potential to emit regulated criteria pollutants, including O_3 precursors NO_X and VOCs, CO, SO_2, PM_{10}, and $PM_{2.5}$. Estimated peak daily emissions of each of these pollutants from the Physical Control Alternative in the individual District are shown in Table 10-13 and are less than the daily thresholds shown in Table 10-3. Annual thresholds do not apply to estimated emissions shown in Table 10-7 because mosquito and vector control activities do not comprise a stationary source of air contaminants. Since mosquito and vector control activities use relatively small amounts of diesel fuel (most equipment and vehicles are gasoline-powered), potential DPM emissions would be small, transient in nature, and dispersed over a wide geographic area. Thus, no significant risk to sensitive receptors would occur from DPM emissions (as PM_{10}). Based on estimated peak daily

emissions for each criteria pollutant, the Physical Control Alternative would not be the sole cause of a violation of either NAAQS or CAAQS.

> **Impact AQ-9:** Based on the estimated daily emissions for each criteria pollutant, the Physical Control Alternative would not expose sensitive receptors to substantial pollutant concentrations. Impacts would be **less than significant** and no mitigation is required.

Create objectionable odors affecting a substantial number of people?

Certain VOCs, sulfur compounds, and chlorine compounds found in some pesticides, fumigants, and organochlorines emit characteristic odors when they evaporate (volatilize) into air, even at very low concentrations well within safety limits. The human sense of smell (olfactory system) is sensitive to these types of compounds as a warning mechanism, and some individuals are more sensitive than others. The Physical Control Alternative would not apply these types of odorous chemical treatments. Thus, people would not be affected by objectionable odors.

> **Impact AQ-10:** The Physical Control Alternative would not subject people to objectionable odors. **No impact** would occur.

10.2.5 Vegetation Management Alternative

The Vegetation Management Alternative would be a continuation of existing activities the District currently practices using applicable techniques, equipment, vehicles, and watercraft. Vegetation management is used to reduce the habitat value for mosquitoes and other vectors and/or to provide access to sources of mosquito production. The District uses hand tools and sometimes heavy equipment to remove vegetation primarily in aquatic habitats. The District may also apply herbicides to remove vegetation. The District would employ BMPs listed in Section 10.2.2 to avoid or minimize impacts to air quality from herbicide use. The environmental impact concerns are phrased as questions as follows for the Vegetation Management Alternative.

Conflict with or obstruct implementation of the applicable Air Quality Attainment Plan or Congestion Management Plan?

The emission source categories associated with the Vegetation Management Alternative include small equipment, portable equipment, offroad vehicles, onroad vehicles, and watercraft, all of which are mobile sources of nonattainment pollutants NO_X, VOCs, PM_{10}, and $PM_{2.5}$. As discussed in Section 10.1.6, these types of emission sources are included in the SIP emission inventory, required to meet CARB and USEPA nonroad and onroad emission standards applicable on the date of manufacture, and subject to PERP and ATCM as applicable. Taken together, these conditions establish that the Vegetation Management Alternative would not conflict with applicable air quality attainment plans.

> **Impact AQ-11:** Based on the general inclusion of Vegetation Management Alternative emissions in the SIP emission inventory and the compliance with applicable air regulations, the Vegetation Management would not conflict with applicable air quality plans. Impacts would be **less than significant** and no mitigation is required.

Violate any stationary source air quality standard or contribute to an existing or projected air quality violation?

The Vegetation Management Alternative has the potential to emit regulated criteria pollutants, including O_3 precursors NO_X and VOCs, CO, SO_2, PM_{10}, and $PM_{2.5}$. Estimated peak daily emissions of each of these pollutants from all alternatives combined in the District are shown in Table 10-12 and are less than the daily thresholds shown in Table 10-3. Annual thresholds do not apply to estimated emissions shown in Table 10-8 because mosquito and vector control activities do not comprise a stationary source of air contaminants. Since mosquito and vector control activities are widely dispersed across a broad geographic area, no violation of CAAQS for CO would occur. Based on estimated peak daily emissions

for each criteria pollutant and geographic dispersion, the Vegetation Management Alternative would not be the sole cause of a violation of either NAAQS or CAAQS.

> **Impact AQ-12:** Based on estimated daily emissions for each criteria pollutant, the Vegetation Management Alternative would not violate an ambient air quality standard. Impacts would be **less than significant** and no mitigation is required.

Result in a net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors)?

As discussed in Section 10.1.6, the focus of this assessment is on regulated criteria pollutants for which the local air basin is in nonattainment. Nonattainment pollutants include O_3 precursors NO_X and VOCs, PM_{10}, and $PM_{2.5}$. Estimated peak daily emissions of each of these pollutants from all alternatives combined in the District are shown in Table 10-12 and are less than the daily thresholds shown in Table 10-3. Annual thresholds do not apply to estimated emissions shown in Table 10-8 because mosquito and vector control activities do not comprise a stationary source of air contaminants. Based on estimated peak daily emissions for each criteria pollutant and geographic dispersion, the Vegetation Management Alternative would not result in a cumulatively considerable increase of nonattainment pollutants. Further, as discussed in Sections 10.2.2.2, the primary sources of VOC emissions from mosquito abatement and vector control activities are from gasoline, diesel, and turbine engines used to conduct the Program. Other sources of VOCs from herbicide materials would be relatively minor compared to engine exhaust and would be neither substantial nor cumulatively considerable.

> **Impact AQ-13:** Based on estimated daily emissions for each criteria pollutant, the Vegetation Management Alternative would not result in a cumulatively considerable increase of nonattainment pollutants. Impacts would be **less than significant** and no mitigation is required.

Expose sensitive receptors to substantial pollutant concentrations?

The Vegetation Management Alternative has the potential to emit regulated criteria pollutants, including O_3 precursors NO_X and VOCs, CO, SO_2, PM_{10}, and $PM_{2.5}$. Estimated peak daily emissions of each of these pollutants from all alternatives combined in the District are shown in Table 10-12 and are less than the daily thresholds shown in Table 10-3. Annual thresholds do not apply to estimated emissions shown in Table 10-8 because mosquito and vector control activities do not comprise a stationary source of air contaminants. Since mosquito and vector control activities use relatively small amounts of diesel fuel (most equipment and vehicles are gasoline-powered), potential DPM emissions would be small, transient in nature, and dispersed over a wide geographic area. Thus, no significant risk to sensitive receptors would occur from DPM emissions (as PM_{10}). Based on estimated peak daily emissions for each criteria pollutant, the Vegetation Management Alternative would not be the sole cause of a violation of either NAAQS or CAAQS.

> **Impact AQ-14:** Based on the estimated daily emissions for each criteria pollutant, the Vegetation Management Alternative would not expose sensitive receptors to substantial pollutant concentrations. Impacts would be **less than significant** and no mitigation is required.

Create objectionable odors affecting a substantial number of people?

Certain VOCs, sulfur compounds, and chlorine compounds found in some pesticides, fumigants, and organochlorines emit characteristic odors when they evaporate (volatilize) into air, even at very low concentrations well within safety limits. The human sense of smell (olfactory system) is sensitive to these types of compounds as a warning mechanism, and some individuals are more sensitive than others. The

Vegetation Management Alternative would not apply these types of odorous treatments; the herbicides used would not be odorous as well. Thus, people would not be affected by objectionable odors.

> **Impact AQ-15:** The Vegetation Management Alternative would not subject people to objectionable odors. **No impact** would occur.

10.2.6 Biological Control Alternative

The Biological Control Alternative would be a continuation of existing activities the District currently practices using applicable techniques, equipment, and vehicles. It involves the use of mosquito predators, mosquitofish (*Gambusia affinis*), with the biological pathogens evaluated under the Chemical Control Alternative. The environmental impact concerns are phrased as questions as follows for the Biological Control Alternative:

Conflict with or obstruct implementation of the applicable Air Quality Attainment Plan or Congestion Management Plan?

The emission source categories associated with the Biological Control Alternative include small equipment, portable equipment, offroad vehicles, and onroad vehicles, all of which are mobile sources of nonattainment pollutants NO_X, VOCs, PM_{10}, and $PM_{2.5}$. As discussed in Section 10.1.6, these types of emission sources are included in the SIP emission inventory, required to meet CARB and USEPA nonroad and onroad emission standards applicable on the date of manufacture, and subject to PERP and ATCM as applicable. Taken together, these conditions establish that the Biological Control Alternative would not conflict with applicable air quality attainment plans.

> **Impact AQ-16:** Based on the general inclusion of Biological Control Alternative emissions in the SIP emission inventory and the compliance with applicable air regulations, the Biological Control Alternative would not conflict with applicable air quality plans. Impacts would be **less than significant** and no mitigation is required.

Violate any stationary source air quality standard or contribute to an existing or projected air quality violation?

The Biological Control Alternative has the potential to emit regulated criteria pollutants, including O_3 precursors NO_X and VOCs, CO, SO_2, PM_{10}, and $PM_{2.5}$. Estimated peak daily emissions of each of these pollutants from all alternatives combined in the District are shown in Table 10-12 and are less than the daily thresholds shown in Table 10-3. Annual thresholds do not apply to estimated emissions shown in Table 10-9 because mosquito and vector control activities do not comprise a stationary source of air contaminants. Since mosquito and vector control activities are widely dispersed across a broad geographic area, no violation of CAAQS for CO would occur. Based on estimated peak daily emissions for each criteria pollutant and geographic dispersion, the Biological Control Alternative would not be the sole cause of a violation of either NAAQS or CAAQS.

> **Impact AQ-17:** Based on estimated daily emissions for each criteria pollutant, the Biological Control Alternative would not violate an ambient air quality standard. Impacts would be **less than significant** and no mitigation is required.

Result in a net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors)?

As discussed in Section 10.1.6, the focus of this assessment is on regulated criteria pollutants for which the local air basin is in nonattainment. Nonattainment pollutants include O_3 precursors NO_X and VOCs, PM_{10}, and $PM_{2.5}$. Estimated peak daily emissions of each of these pollutants from all alternatives combined in the District are shown in Table 10-12 and are less than the daily thresholds shown in Table 10-3. Annual thresholds do not apply to estimated emissions shown in Table 10-9 because

mosquito and vector control activities do not comprise a stationary source of air contaminants. Based on estimated peak daily emissions for each criteria pollutant and geographic dispersion, the Biological Control Alternative would not result in a cumulatively considerable increase of nonattainment pollutants. Further, as discussed in Section 10.2.2.2, the primary sources of VOC emissions from mosquito abatement and vector control activities are from gasoline, diesel, and turbine engines used to conduct the Program. Other sources of VOCs from materials would be relatively minor compared to engine exhaust and would be neither substantial nor cumulatively considerable.

> **Impact AQ-18:** Based on estimated daily emissions for each criteria pollutant, the Biological Control Alternative would not result in a cumulatively considerable increase of nonattainment pollutants. Impacts would be **less than significant** and no mitigation is required.

Expose sensitive receptors to substantial pollutant concentrations?

The Biological Control Alternative has the potential to emit regulated criteria pollutants, including O_3 precursors NO_X and VOCs, CO, SO_2, PM_{10}, and $PM_{2.5}$. Estimated peak daily emissions of each of these pollutants from all alternatives combined in the District are shown in Table 10-12 and are less than the daily thresholds shown in Table 10-3. Annual thresholds do not apply to estimated emissions shown in Table 10-9 because mosquito and vector control activities do not comprise a stationary source of air contaminants. Since mosquito and vector control activities use relatively small amounts of diesel fuel (most equipment and vehicles are gasoline-powered), potential DPM emissions would be small, transient in nature, and dispersed over a wide geographic area. Thus, no significant risk to sensitive receptors would occur from DPM emissions (as PM_{10}). Based on estimated peak daily emissions for each criteria pollutant, the Biological Control Alternative would not be the sole cause of a violation of either NAAQS or CAAQS.

> **Impact AQ-19:** Based on the estimated daily emissions for each criteria pollutant, the Biological Control Alternative would not expose sensitive receptors to substantial pollutant concentrations. Impacts would be **less than significant** and no mitigation is required.

Create objectionable odors affecting a substantial number of people?

Certain VOCs, sulfur compounds, and chlorine compounds found in some pesticides emit characteristic odors when they evaporate (volatilize) into air, even at very low concentrations well within safety limits. The human sense of smell (olfactory system) is sensitive to these types of compounds as a warning mechanism, and some individuals are more sensitive than others. The Biological Control Alternative would not apply these types of odorous treatments. Thus, people would not be subjected to objectionable odors.

> **Impact AQ-20:** The Biological Control Alternative would not subject people to objectionable odors. **No impact** would occur.

10.2.7 Chemical Control Alternative

The Chemical Control Alternative would be a continuation of existing activities the District currently practices using applicable techniques, equipment, vehicles, watercraft, and aircraft. It involves the application of insecticides to reduce populations of vector species. The District employs BMPs listed in Section 10.2.2 to avoid or minimize impacts to air quality from pesticide use. The environmental impact concerns are phrased as questions as follows for the Chemical Control Alternative.

Conflict with or obstruct implementation of the applicable Air Quality Attainment Plan or Congestion Management Plan?

The emission source categories associated with the Chemical Control Alternative include small equipment, portable equipment, offroad vehicles, onroad vehicles, watercraft, and aircraft all of which are mobile sources of nonattainment pollutants NO_X, VOCs, PM_{10}, and $PM_{2.5}$. As discussed in Section 10.1.6, these types of emission sources are included in the SIP emission inventory, required to meet CARB and USEPA nonroad and onroad emission standards applicable on the date of manufacture, and subject to

PERP and ATCM as applicable. Taken together, these conditions establish that the Chemical Control Alternative would not conflict with applicable air quality attainment plans.

> **Impact AQ-21:** Based on the general inclusion of Chemical Control Alternative emissions in the SIP emission inventory and the compliance with applicable air regulations, the Chemical Control Alternative would not conflict with applicable air quality plans. Impacts would be **less than significant** and no mitigation is required.

Violate any stationary source air quality standard or contribute to an existing or projected air quality violation?

The Chemical Control Alternative has the potential to emit regulated criteria pollutants, including O_3 precursors NO_X and VOCs, CO, SO_2, PM_{10}, and $PM_{2.5}$. Estimated peak daily emissions of each of these pollutants from all alternatives combined in the District are shown in Table 10-12 and are less than the daily thresholds shown in Table 10-3. Annual thresholds do not apply to estimated emissions shown in Table 10-10 because mosquito and vector control activities do not comprise a stationary source of air contaminants. Since mosquito and vector control activities are widely dispersed across a broad geographic area, no violation of CAAQS for CO would occur. Based on estimated peak daily emissions for each criteria pollutant and geographic dispersion, the Chemical Control Alternative would not be the sole cause of a violation of either NAAQS or CAAQS.

> **Impact AQ-22:** Based on estimated daily emissions for each criteria pollutant, the Chemical Control Alternative would not violate an ambient air quality standard. Impacts would be **less than significant** and no mitigation is required.

Result in a net increase of any criteria pollutant for which the project region is nonattainment under an applicable NAAQS or CAAQS (including releasing emissions, which exceed quantitative thresholds for O_3 precursors)?

As discussed in Section 10.1.6, the focus of this assessment is on regulated criteria pollutants for which the local air basin is in nonattainment. Nonattainment pollutants include O_3 precursors NO_X and VOCs, PM_{10}, and $PM_{2.5}$. Estimated peak daily emissions of each of these pollutants from all alternatives combined in the District are shown in Table 10-12 and are less than the daily thresholds shown in Table 10-3. Annual thresholds do not apply to estimated emissions shown in Table 10-10 because mosquito and vector control activities do not comprise a stationary source of air contaminants. Based on estimated peak daily emissions for each criteria pollutant and geographic dispersion, the Chemical Control Alternative would not result in a cumulatively considerable increase of nonattainment pollutants. Further, as discussed in Section 10.2.2.2, the primary sources of VOC emissions from mosquito abatement and vector control activities are from gasoline, diesel, and turbine engines used to conduct the Program. Other sources of VOCs from pesticide materials would be relatively minor compared to engine exhaust and would be neither substantial nor cumulatively considerable.

> **Impact AQ-23:** Based on estimated daily emissions for each criteria pollutant, the Chemical Control Alternative would not result in a cumulatively considerable increase of nonattainment pollutants**.** Impacts would be **less than significant** and no mitigation is required.

Expose sensitive receptors to substantial pollutant concentrations?

The Chemical Control Alternative has the potential to emit regulated criteria pollutants, including O_3 precursors NO_X and VOCs, CO, SO_2, PM_{10}, and $PM_{2.5}$. Estimated peak daily emissions of each of these pollutants from all alternatives combined in the District are shown in Table 10-12 and are less than the daily thresholds shown in Table 10-3. Annual thresholds do not apply to estimated emissions shown in Table 10-10 because mosquito and vector control activities do not comprise a stationary source of air contaminants. Since mosquito and vector control activities use relatively small amounts of diesel fuel (most equipment and vehicles are gasoline-powered), potential DPM emissions would be small, transient in

nature, and dispersed over a wide geographic area. Thus, no significant risk to sensitive receptors would occur from DPM emissions (as PM_{10}). Based on estimated peak daily emissions for each criteria pollutant, the Chemical Control Alternative would not be the sole cause of a violation of either NAAQS or CAAQS.

> **Impact AQ-24:** Based on the estimated daily emissions for each criteria pollutant, the Chemical Control Alternative would not expose sensitive receptors to substantial pollutant concentrations**.** Impacts would be **less than significant** and no mitigation is required.

Create objectionable odors affecting a substantial number of people?

Certain VOCs, sulfur compounds, and chlorine compounds found in some pesticides, fumigants, and organochlorines emit characteristic odors when they evaporate (volatilize) into air, even at very low concentrations well within safety limits. Pesticides proposed for future use emit phenols (e.g., deltamethrin, etofenprox, permethrin, and resmethrin). Materials such as Bti in liquid form and the adulticides pyrethrin and permethrin have an odor. Due to limited applicability, small quantities of these types of substances are typically used.

The human sense of smell (olfactory system) is sensitive to these types of compounds as a warning mechanism, and some individuals are more sensitive than others. The Chemical Control Alternative would apply certain types of odorous treatments using hydraulic spraying and atomizing (fogging), which could result in drift of small droplets and gaseous vapors. Depending on atmospheric conditions (i.e., wind direction, wind speed, stability class), this drift could subject people to objectionable odors near a treatment area. Without site-specific information, it cannot be determined whether an objectionable odor may persist downwind of a particular treatment area; therefore, an application containing an odorous compound may impact an undefined number people for an undefined period of time including recreationists and residents. The materials have been used in the current Program, and people have not complained about odors. However, it is possible that complaints could occur in the future.

> **Impact AQ-25:** The Chemical Control Alternative could subject people to objectionable odors. Impacts could be **potentially significant but mitigable**, even with BMPs implemented.

To mitigate Impact AQ-25, the District and its contractors may implement any of the following measures as applicable to the specific application situation to reduce drift towards human populations/residences from the ground and aerial applications of odorous treatment compounds:

> Mitigation Measure AQ-25a: Whenever possible and practicable, defer application of treatment compounds until such time that favorable wind conditions would reduce or avoid the risk of drift into populated areas.
>
> Mitigation Measure AQ-25b: Utilize equipment such as wind meters and global positioning system (GPS) tracking when applicable that assist in documenting site-specific compliance with all label requirements for drift mitigation.
>
> Mitigation Measure AQ-25c: Use precision application technology to reduce drift and the total amount of material applied. This measure can include (1) Precision guidance systems that minimize ground or aerial spray overlap (e.g., GPS and Real Time Kinetics – GPS/RTK) and (2) Computer-guided application systems that integrate real-time meteorological data and computer model guidance to reduce drift from aerial application (e.g., trade names “AIMMS,” “Wingman™ GX,” and “NextStar™ Flow Control”).

Use of any one of these measures would reduce the impact to **less than significant**.

10.2.8 Other Nonchemical Control/Trapping Alternative

As applicable, the Other Nonchemical Control/Trapping Alternative would be the District conducting limited trapping activities using applicable techniques, existing equipment, and existing vehicles. An example of these types of activities would be trapping of rodents and/or yellow jackets to determine presence in an area. The environmental impact concerns are phrased as questions as follows for the Other Nonchemical Control/Trapping Alternative.

Conflict with or obstruct implementation of the applicable Air Quality Attainment Plan or Congestion Management Plan?

The emission source categories associated with the Other Nonchemical Control/Trapping Alternative include small equipment, portable equipment, offroad vehicles, onroad vehicles, and watercraft, all of which are mobile sources of nonattainment pollutants NO_X, VOCs, PM_{10}, and $PM_{2.5}$. As discussed in Section 10.1.6, these types of emission sources are included in the SIP emission inventory, required to meet CARB and USEPA nonroad and onroad emission standards applicable on the date of manufacture, and subject to PERP and ATCM as applicable. Taken together, these conditions establish that the Other Nonchemical Control/Trapping Alternative would not conflict with applicable air quality attainment plans.

> **Impact AQ-26:** Based on the general inclusion of Other Nonchemical Control/Trapping Alternative emissions in the SIP emission inventory and the compliance with applicable air regulations, the Other Nonchemical Control/Trapping Alternative would not conflict with applicable air quality plans**.** Impacts would be **less than significant** and no mitigation is required.

Violate any stationary source air quality standard or contribute to an existing or projected air quality violation?

The Other Nonchemical Control/Trapping Alternative has the potential to emit regulated criteria pollutants, including O_3 precursors NO_X and VOCs, CO, SO_2, PM_{10}, and $PM_{2.5}$. Estimated peak daily emissions of each of these pollutants from all alternatives combined in the District are shown in Table 10-12 and are less than the daily thresholds shown in Table 10-3. Annual thresholds do not apply to estimated emissions shown in Table 10-11 because mosquito and vector control activities do not comprise a stationary source of air contaminants. Since mosquito and vector control activities are widely dispersed across a broad geographic area, no violation of CAAQS for CO would occur. Based on estimated peak daily emissions for each criteria pollutant and geographic dispersion, the Other Nonchemical Control/Trapping Alternative would not be the sole cause of a violation of either NAAQS or CAAQS.

> **Impact AQ-27:** Based on estimated daily emissions for each criteria pollutant, the Other Nonchemical Control/Trapping Alternative would not violate an ambient air quality standard. Impacts would be **less than significant** and no mitigation is required.

Result in a net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors)?

As discussed in Section 10.1.6, the focus of this assessment is on regulated criteria pollutants for which the local air basin is in nonattainment. Nonattainment pollutants include O_3 precursors NO_X and VOCs, PM_{10}, and $PM_{2.5}$. Estimated peak daily emissions of each of these pollutants from all alternatives combined in the District are shown in Table 10-12 and are less than the daily thresholds shown in Table 10-3. Annual thresholds do not apply to estimated emissions shown in Table 10-11 because mosquito and vector control activities do not comprise a stationary source of air contaminants. Based on estimated peak daily emissions for each criteria pollutant and geographic dispersion, the Other Nonchemical Control/Trapping Alternative would not result in a cumulatively considerable increase of nonattainment pollutants. Further, as discussed in Section 10.2.2.2, the primary sources of VOC

emissions from mosquito abatement and vector control activities are from gasoline, diesel, and turbine engines used to conduct the Program. Other sources of VOCs from materials would be relatively minor compared to engine exhaust and would be neither substantial nor cumulatively considerable.

> **Impact AQ-28:** Based on estimated daily emissions for each criteria pollutant, the Other Nonchemical Control/Trapping Alternative would not result in a cumulatively considerable increase of nonattainment pollutants. Impacts would be **less than significant** and no mitigation is required.

Expose sensitive receptors to substantial pollutant concentrations?

The Other Nonchemical Control/Trapping Alternative has the potential to emit regulated criteria pollutants, including O_3 precursors NO_X and VOCs, CO, SO_2, PM_{10}, and $PM_{2.5}$. Estimated peak daily emissions of each of these pollutants from all alternatives combined in the District are shown in Table 10-12 and are less than the daily thresholds shown in Table 10-3. Annual thresholds do not apply to estimated emissions shown in Table 10-11 because mosquito and vector control activities do not comprise a stationary source of air contaminants. Since mosquito and vector control activities use relatively small amounts of diesel fuel (most equipment and vehicles are gasoline-powered), potential DPM emissions would be small, transient in nature, and dispersed over a wide geographic area. Thus, no significant risk to sensitive receptors would occur from DPM emissions (as PM_{10}). Based on estimated peak daily emissions for each criteria pollutant, the Other Nonchemical Control/Trapping Alternative would not be the sole cause of a violation of either NAAQS or CAAQS.

> **Impact AQ-29:** Based on the estimated daily emissions for each criteria pollutant, the Other Nonchemical Control/Trapping Alternative would not expose sensitive receptors to substantial pollutant concentrations. Impacts would be **less than significant** and no mitigation is required.

Create objectionable odors affecting a substantial number of people?

Certain VOCs, sulfur compounds, and chlorine compounds found in some pesticides emit characteristic odors when they evaporate (volatilize) into air, even at very low concentrations well within safety limits. The human sense of smell (olfactory system) is sensitive to these types of compounds as a warning mechanism, and some individuals are more sensitive than others. The Other Nonchemical Control/Trapping Alternative would not apply these types of odorous treatments. Thus, people would not be subjected to objectionable odors.

> **Impact AQ-30:** The Other Nonchemical Control/Trapping Alternative would not subject people to objectionable odors. **No impact** would occur.

10.2.9 Cumulative Impacts

In developing thresholds of significance, BAAQMD considered the emission levels for which a project's individual emissions would be cumulatively considerable. Therefore, if a project would result in an increase in emissions at or above applicable mass thresholds, then it would be deemed to have a cumulatively considerable impact. Conversely, if a project would not exceed the significance thresholds, then its emissions would not be cumulatively considerable. (BAAQMD 2011)

Cumulative impacts to regional air quality are discussed in Section 13.8. The majority of air districts in California, including BAAQMD, NSCAPCD, YSAQMD, MCAQMD, and LCAQMD assume that if project-level emissions do not exceed significance thresholds, and no closely related project exists, then a project would not have a cumulatively considerable impact on air quality. All of the Program alternative emissions (separately and combined for the District's entire Program) would be below the significance thresholds for criteria pollutant emissions. In summary, **the incremental impacts on air quality from the Program**

alternatives are not individually significant nor are they cumulatively considerable. Therefore, cumulative impacts to regional air quality are less than significant.

Concerning the cumulative impact of pesticide use by the District when combined with pesticide use by agriculture, the CDPR restricts use of many agricultural pesticide products that are high in VOCs to comply with the CAA. Statewide use of agricultural pesticides on commercial crops accounts for approximately 2 percent of all VOCs produced in the state, while the VOC emissions of pesticides and herbicides the District typically uses for vector control are minimal to not significant. State restrictions described above include some high-VOC products containing abamectin, chlorpyrifos (not used extensively), gibberellins, or oxyfluorfen (used primarily on some Central California crops), and this concern should not impact District use of pesticides for vector control. (CDPR 2014c)

10.2.10 Environmental Impacts Summary

Table 10-19 presents a summary of air quality impacts associated with the six alternatives in comparison to existing emissions inventories and conditions. The air quality impact callouts correspond to those in Sections 10.2.3 through 10.2.8.

Table 10-19 Summary of Alternative Air Quality Impacts

Impact Statement	Surveillance	Physical Control	Vegetation Management	Biological Control	Chemical Control	Other Nonchemical/ Trapping
Effects on Air Quality						
Impact AQ-1: Based on the general inclusion of Surveillance Alternative emissions in the SIP emission inventory and the compliance with applicable air regulations, the Surveillance Alternative would not conflict with applicable air quality plans. Impacts would be **less than significant** and no mitigation is required**.**	LS	na	na	na	na	na
Impact AQ-2: Based on estimated daily emissions for each criteria pollutant, the Surveillance Alternative would not violate an ambient air quality standard. Impacts would be **less than significant** and no mitigation is required.	LS	na	na	na	na	na
Impact AQ-3: Based on estimated daily emissions for each criteria pollutant, the Surveillance Alternative would not result in a cumulatively considerable increase of nonattainment pollutants. Impacts would be **less than significant** and no mitigation is required.	LS	na	na	na	na	na
Impact AQ-4: Based on the estimated daily emissions for each criteria pollutant, the Surveillance Alternative would not expose sensitive receptors to substantial pollutant concentrations. Impacts would be **less than significant** and no mitigation is required.	LS	na	na	na	na	na
Impact AQ-5: The Surveillance Alternative would not subject people to objectionable odors. **No impact** would occur.	N	na	na	na	na	na
Impact AQ-6: Based on the general inclusion of Physical Control Alternative emissions in the SIP emission inventory and the compliance with applicable air regulations, the Physical Control Alternative would not conflict with applicable air quality plans. Impacts would be **less than significant** and no mitigation is required.	na	LS	na	na	na	na

Table 10-19 Summary of Alternative Air Quality Impacts

Impact Statement	Surveillance	Physical Control	Vegetation Management	Biological Control	Chemical Control	Other Nonchemical/ Trapping
Impact AQ-7: Based on estimated daily emissions for each criteria pollutant, the Physical Control Alternative would not violate an ambient air quality standard. Impacts would be **less than significant** and no mitigation is required.	na	LS	na	na	na	na
Impact AQ-8: Based on estimated daily emissions for each criteria pollutant, the Physical Control Alternative would not result in a cumulatively considerable increase of nonattainment pollutants. Impacts would be **less than significant** and no mitigation is required.	na	LS	na	na	na	na
Impact AQ-9: Based on the estimated daily emissions for each criteria pollutant, the Physical Control Alternative would not expose sensitive receptors to substantial pollutant concentrations. Impacts would be **less than significant** and no mitigation is required.	na	LS	na	na	na	na
Impact AQ-10: The Physical Control Alternative would not subject people to objectionable odors. **No impact** would occur.	na	N	na	na	na	na
Impact AQ-11: Based on the general inclusion of Vegetation Management Alternative emissions in the SIP emission inventory and the compliance with applicable air regulations, the Vegetation Management would not conflict with applicable air quality plans. Impacts would be **less than significant** and no mitigation is required.	na	na	LS	na	na	na
Impact AQ-12: Based on estimated daily emissions for each criteria pollutant, the Vegetation Management Alternative would not violate an ambient air quality standard. Impacts would be **less than significant** and no mitigation is required.	na	na	LS	na	na	na
Impact AQ-13: Based on estimated daily emissions for each criteria pollutant, the Vegetation Management Alternative would not result in a cumulatively considerable increase of nonattainment pollutants. Impacts would be **less than significant** and no mitigation is required.	na	na	LS	na	na	na

Table 10-19 Summary of Alternative Air Quality Impacts

Impact Statement	Surveillance	Physical Control	Vegetation Management	Biological Control	Chemical Control	Other Nonchemical/ Trapping
Impact AQ-14: Based on the estimated daily emissions for each criteria pollutant, the Vegetation Management Alternative would not expose sensitive receptors to substantial pollutant concentrations. Impacts would be **less than significant** and no mitigation is required.	na	na	LS	na	na	na
Impact AQ-15: The Vegetation Management Alternative would not subject people to objectionable odors. **No impact** would occur.	na	na	N	na	na	na
Impact AQ-16: Based on the general inclusion of Biological Control Alternative emissions in the SIP emission inventory and the compliance with applicable air regulations, the Biological Control Alternative would not conflict with applicable air quality plans. Impacts would be **less than significant** and no mitigation is required.	na	na	na	LS	na	na
Impact AQ-17: Based on estimated daily emissions for each criteria pollutant, the Biological Control Alternative would not violate an ambient air quality standard. Impacts would be **less than significant** and no mitigation is required.	na	na	na	LS	na	na
Impact AQ-18: Based on estimated daily emissions for each criteria pollutant, the Biological Control Alternative would not result in a cumulatively considerable increase of nonattainment pollutants**.** Impacts would be **less than significant** and no mitigation is required.	na	na	na	LS	na	na
Impact AQ-19: Based on the estimated daily emissions for each criteria pollutant, the Biological Control Alternative would not expose sensitive receptors to substantial pollutant concentrations. Impacts would be **less than significant** and no mitigation is required.	na	na	na	LS	na	na
Impact AQ-20: The Biological Control Alternative would not subject people to objectionable odors. **No impact** would occur.	na	na	na	N	na	na

Table 10-19 Summary of Alternative Air Quality Impacts

Impact Statement	Surveillance	Physical Control	Vegetation Management	Biological Control	Chemical Control	Other Nonchemical/ Trapping
Impact AQ-21: Based on the general inclusion of Chemical Control Alternative emissions in the SIP emission inventory and the compliance with applicable air regulations, the Chemical Control Alternative would not conflict with applicable air quality plans. Impacts would be **less than significant** and no mitigation is required.	na	na	na	na	LS	na
Impact AQ-22: Based on estimated daily emissions for each criteria pollutant, the Chemical Control Alternative would not violate an ambient air quality standard. Impacts would be **less than significant** and no mitigation is required.	na	na	na	na	LS	na
Impact AQ-23: Based on estimated daily emissions for each criteria pollutant, the Chemical Control Alternative would not result in a cumulatively considerable increase of nonattainment pollutants**.** Impacts would be **less than significant** and no mitigation is required.	na	na	na	na	LS	na
Impact AQ-24: Based on the estimated daily emissions for each criteria pollutant, the Chemical Control Alternative would not expose sensitive receptors to substantial pollutant concentrations**.** Impacts would be **less than significant** and no mitigation is required.	na	na	na	na	LS	na
Impact AQ-25: The Chemical Control Alternative could subject people to objectionable odors. Impacts could be **potentially significant but mitigable**, even with BMPs implemented.	na	na	na	na	SM	na
Impact AQ-26: Based on the general inclusion of Other Nonchemical Control/Trapping Alternative emissions in the SIP emission inventory and the compliance with applicable air regulations, the Other Nonchemical Control/Trapping Alternative would not conflict with applicable air quality plans**.** Impacts would be **less than significant** and no mitigation is required.	na	na	na	na	na	LS

Table 10-19 Summary of Alternative Air Quality Impacts

Impact Statement	Surveillance	Physical Control	Vegetation Management	Biological Control	Chemical Control	Other Nonchemical/ Trapping
Impact AQ-27: Based on estimated daily emissions for each criteria pollutant, the Other Nonchemical Control/Trapping Alternative would not violate an ambient air quality standard. Impacts would be **less than significant** and no mitigation is required.	na	na	na	na	na	LS
Impact AQ-28: Based on estimated daily emissions for each criteria pollutant, the Other Nonchemical Control/Trapping Alternative would not result in a cumulatively considerable increase of nonattainment pollutants. Impacts would be **less than significant** and no mitigation is required.	na	na	na	na	na	LS
Impact AQ-29: Based on the estimated daily emissions for each criteria pollutant, the Other Nonchemical Control/Trapping Alternative would not expose sensitive receptors to substantial pollutant concentrations. Impacts would be **less than significant** and no mitigation is required.	na	na	na	na	na	LS
Impact AQ-30: The Other Nonchemical Control/Trapping Alternative would not subject people to objectionable odors. **No impact** would occur.	na	na	na	na	na	N

Sources: BAAQMD 1999; Hare and Springer 1973; CARB 2008a; USEPA 1991d, 2011a, 2011b, 2012c

LS = Less-than-significant impact

N = No impact

na = Not applicable

SM = Potentially significant but mitigable impact

SU = Significant and unavoidable impact

10.2.11 Mitigation and Monitoring

Except for mitigated odor impacts under the Chemical Control Alternative (Impact AQ-25), all other impacts are either less than significant (LS) or no impact (N) and require no mitigation. The District will reduce small impacts even further (under Impacts AQ-2/3, AQ-7/8, AQ-12/13, AQ-17/18, AQ-22/23, and AQ-27/28), as described below.

Notwithstanding significance, BMPs pursuant to California Air Toxics Control Measures (13 CCR 2485) and In-Use Off-Road Diesel Vehicle Regulations (13 CCR 2449 et seq.) will also minimize criteria pollutant and GHG emissions from diesel and gasoline engine exhaust. The District and its contractors will implement the following BMPs as part of the Program:

> Idling times shall be minimized either by shutting equipment and vehicles off when not in use or reducing the maximum idling time to 5 minutes. Clear signage shall be provided for workers at all access points.

> Correct tire inflation shall be maintained in accordance with manufacturer's specifications on wheeled equipment and vehicles to prevent excessive rolling resistance.

> All equipment and vehicles shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified visible emissions evaluator if visible emissions are apparent to onsite staff.

Also, where practicable and available, the Program will use alternatively fueled equipment, such as compressed natural gas (CNG), liquefied natural gas (LNG), liquefied petroleum/propane gas (LPG), or biodiesel.

To mitigate Impact AQ-25, the District and its contractors may implement any of the following measures as applicable to reduce drift from the ground and aerial application of treatment compounds:

Mitigation Measure AQ-25a: When possible, defer application of treatment compounds until such time that favorable wind conditions would reduce or avoid the risk of drift into populated areas.

> Location: Areas to receive treatment with pesticides that are near residential and commercial land uses

> Monitoring/Reporting Action: District staff to check current land use maps or aerial photos prior to treatments

> Effectiveness Criteria: Document odor complaints from the public

> Responsible Agency: District

> Timing: Prior to chemical treatments

Mitigation Measure AQ-25b: Use weather forecasts, real-time observations, wind meters, and GPS equipment when applicable to assist in documenting site-specific compliance with all label requirements for drift mitigation.

> Location: Areas to receive treatment with pesticides that are near residential and commercial land uses

> Monitoring/Reporting Action: District staff to check current land use maps or aerial photos prior to treatments

> Effectiveness Criteria: Document odor complaints from the public

> Responsible Agency: District

> Timing: Prior to chemical treatments

Mitigation Measure AQ-25c: Use precision application technology to reduce drift and the total amount of material applied. This measure can include (1) precision guidance systems that minimize ground or aerial spray overlap (e.g., GPS and Real Time Kinetics – GPS/RTK) and (2) computer-guided application systems that integrate real-time meteorological data and computer model guidance to reduce drift from aerial application (e.g., trade names “AIMMS,” “Wingman™ GX,” and “NextStar™ Flow Control”). This technology is possible with equipment such as the helicopter/aircraft and application of adulticides with the larger truck-mounted ULV foggers but not for small site-specific applications by hand equipment or ATVs. The District currently outfits all ATVs with GPS guidance systems. These ATV applications are typically low volume and staff is trained (via CDPH) to make decisions in the field to correctly and accurately apply materials. This shift is not difficult at the slow speeds involved in these applications. District also has physical site information (e.g., size of treatment area) to assist in precision of the application.

> Location: Areas to receive treatment with pesticides that are near residential and commercial land uses

> Monitoring/Reporting Action: District staff to check current land use maps or aerial photos prior to treatments

> Effectiveness Criteria: Document odor complaints from the public

> Responsible Agency: District

> Timing: Prior to chemical treatments