

# 11 Greenhouse Gases and Climate Change

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This chapter provides an overview of the environmental setting for greenhouse gases (GHGs) and climate change, based on Appendix C, *Air Quality and Greenhouse Gases Technical Report*. The American Meteorological Society refers to climate change as any systematic change in the long-term statistics of climate elements (such as temperature, pressure, or winds) sustained over several decades or longer. The Society also indicates that climate change may be due to natural external forces, such as changes in solar emission or slow changes in the Earth's orbital elements; natural internal processes of the climate system; or anthropogenic forcing (AMS 2014). The climate system can be influenced by changes in the concentration of various GHGs in the atmosphere that affect the Earth's absorption of radiation. This chapter concludes with an evaluation of the Proposed Program's contribution to GHG emissions and conclusions of environmental impact. It concludes with a discussion of how the District will reduce small impacts even further using BMPs.

## 11.1 Environmental Setting

### 11.1.1 Global Climate Change

Climate change refers to any measurable alteration of climate lasting for an extended period of time – several decades or longer – and includes recordable changes in temperature, precipitation, or wind patterns. The average temperature of the Earth has increased about 0.7 to 1.5°F (0.4 to 0.8°C) over the past century, and is projected to rise another 2 to 11.5°F (1.1 to 6.4°C) over the next 100 years (IPCC 2001; USEPA 2012b). Seemingly, small changes in the average temperature of the planet can translate to large and potentially hazardous shifts in climate and weather. Climate change is suspected as the cause of changes in rainfall amounts and distribution that can result in flooding, droughts, or more frequent and severe heat waves. Also, oceans are warming and becoming more acidic, polar ice caps are melting, glaciers are receding, and sea levels are rising due to thermal expansion and ice loss. Long-term studies indicate that ocean surface temperatures have been rising at an average rate of 0.13°F (0.07°C) per decade and since 1901, average sea level has increased by about 8 inches (20 centimeters) during the same period, and average pH has decreased (acidified) by about 0.05 pH units since the mid-1980s. Late summer Arctic Ocean sea ice coverage has decreased by half since 1979, and glaciers have receded and lost significant mass since the 1970s (USEPA 2012b). As climate change progresses in the coming decades, it will likely present challenges to society and the environment.

#### 11.1.1.1 Local Climate

The Program Area climate is characterized by moderately wet winters and dry summers. For the region including the Marin-Sonoma Mosquito Vector Control District (MSMVCD, the District), 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°F (15°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).

#### 11.1.2 The Greenhouse Effect

Over the past century, human activities have released large amounts of carbon dioxide (CO<sub>2</sub>) and other GHGs into the atmosphere. The majority of GHGs are the by-product of burning fossil fuels to release

energy in the form of heat, although deforestation, industrial processes, and some agricultural practices also emit GHGs into the atmosphere. GHGs trap solar energy in the atmosphere and cause it to warm. This phenomenon is called the greenhouse effect and is necessary to support life on Earth; however, excessive buildup of GHGs can change Earth's climate and result in undesirable effects on ecosystems, which affect human health and welfare. (USEPA 2012b)

In its *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2012* (USEPA 2012c, 2014b), the USEPA provides summary information on the work of the United Nations Framework Convention on Climate Change (UNFCCC 2009) and the Intergovernmental Panel on Climate Control (IPCC 1990-2013); key information from that report is summarized below – more details may be found in the cited source documents.

The UNFCCC defines climate change as “a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods” (UNFCCC 2009). In its *Second Assessment Report* of the science of climate change, the IPCC concluded “human activities are changing the atmospheric concentrations and distributions of greenhouse gases and aerosols” (IPCC 1995). These changes can produce a radiative forcing by changing either the reflection or absorption of solar radiation, or the emission and absorption of terrestrial radiation.” Building on this conclusion, the IPCC *Third Assessment Report* (IPCC 2001) asserted “concentrations of atmospheric greenhouse gases and their radiative forcing have continued to increase as a result of human activities.”

The IPCC reports the global average surface temperature of the Earth has increased by  $1.1 \pm 0.4^\circ\text{F}$  ( $0.6 \pm 0.2^\circ\text{C}$ ) over the 20th century. This value is about  $0.27^\circ\text{F}$  ( $0.15^\circ\text{C}$ ) larger than that estimated by the Second Assessment Report, which reported for the period up to 1994, “owing to the relatively high temperatures of the additional years (1995 to 2000) and improved methods of processing the data.”

While the *Second Assessment Report* (1995) concluded, “the balance of evidence suggests there is a discernible human influence on global climate,” the *Third Assessment Report* (2001) more directly connects the influence of human activities on climate. IPCC concluded, “In light of new evidence and taking into account the remaining uncertainties, most of the observed warming over the last 50 years is likely to have been due to the increase in greenhouse gas concentrations.”

In its most recent *Fourth Assessment Report* (2007), IPCC stated warming of Earth's climate is unequivocal, and that warming is very likely attributable to increases in atmospheric GHGs caused by human activities (IPCC 2007). IPCC further stated changes in many physical and biological systems, such as increases in global temperatures, more frequent heat waves, rising sea levels, coastal flooding, loss of wildlife habitat, spread of infectious disease, and other potential environmental impacts, are linked to changes in the climate system, and some changes might be irreversible.

In its newly released *Fifth Assessment Report* (2013), the IPCC reinforced evidence for warming of the climate system since the 1950s. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and GHG concentrations have increased. Each of the last 3 decades has been successively warmer at the Earth's surface than any preceding decade since 1850. In the Northern Hemisphere, 1983 to 2012 was likely the warmest 30-year period of the last 1,400 years. IPCC reports (IPCC 2013):

- > The atmospheric concentrations of CO<sub>2</sub>, methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O) have all increased since 1750 due to human activity. In 2011, average concentrations of CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O were 390, 1.8, and 0.3 ppmv, respectively, which are higher than pre-industrial levels by about 40, 150, and 20 percent, respectively.
- > The globally averaged combined land and ocean surface temperature data, as calculated by a linear trend, showed an average warming of  $1.5^\circ\text{F}$  ( $0.85^\circ\text{C}$ ) over the period 1880 to 2012. The average total increase between the 1850 to 1900 period and the 2003 to 2012 period was  $1.4^\circ\text{F}$  ( $0.78^\circ\text{C}$ ).

- > Ocean warming dominates the increase in energy stored in the climate system, accounting for more than 90 percent of the energy accumulated between 1971 and 2010. The rate of sea-level rise since the mid-19<sup>th</sup> century has been larger than the mean rate during the previous 2 millennia. Over the period 1901 to 2010, global mean sea level rose by 0.62 foot (0.19 meter).

Over the last 2 decades, the Greenland and Antarctic ice sheets have been losing mass, glaciers have continued to shrink almost worldwide, and Arctic sea ice and Northern Hemisphere spring snow cover have continued to decrease in extent.

The mobile sources used in mosquito and vector control activities emit GHGs and, therefore, contribute incrementally to climate change; however, as described in Section 11.2.2, these emissions comprise a very small fraction of the Bay Area, California, and national GHG inventories. This fact precludes any meaningful analysis of quantitative effects that mosquito and vector control operations may specifically have on climate, although taken together with regional, national, and worldwide GHG emissions, global effects are as described above.

### 11.1.3 Greenhouse Gases and Their Emissions

#### 11.1.3.1 *The Atmosphere*

Air is a mixture of constituent gases and its composition varies slightly with location and altitude. For 20<sup>th</sup> century scientific and engineering purposes, it became necessary to define a standard composition known as the US Standard Atmosphere. In addition to the common gases (nitrogen, oxygen, CO<sub>2</sub>, CH<sub>4</sub>, hydrogen, N<sub>2</sub>O), the atmosphere contains noble or inert gases (argon, neon, helium, krypton, xenon). Radon is also present in low concentrations near ground level in limited geographic areas where it is naturally emitted from certain types of rock and soil. Table 11-1 shows the typical composition of dry standard air, which is over 99 percent nitrogen and oxygen (UIG 2008; USEPA 2012c). The apparent molecular weight of dry standard air is 28.966 grams per mole (Jennings 1970; du Pont 1971).

**Table 11-1 Standard Composition of Dry Air**

Principal Gas	Chemical Symbol	Gas MW g/mole	Concentration ppmv	Fraction Percent	Fraction MW g/mole
Nitrogen	N <sub>2</sub>	28.014	780,805.00	78.080500	21.873471
Oxygen	O <sub>2</sub>	31.998	209,440.00	20.944000	6.701661
Argon	Ar	39.948	9,340.00	0.934000	0.373114
Carbon Dioxide	CO <sub>2</sub>	44.009	387.69	0.038769	0.017062
Neon	Ne	20.183	18.21	0.001821	0.000368
Helium	He	4.003	5.24	0.000524	0.000021
Methane	CH <sub>4</sub>	16.043	1.81	0.000181	0.000029
Krypton	Kr	83.800	1.14	0.000114	0.000096
Hydrogen	H <sub>2</sub>	2.016	0.50	0.000050	0.000001
Nitrous Oxide	N <sub>2</sub> O	44.013	0.32	0.000032	0.000014
Xenon	Xe	31.300	0.09	0.000009	0.000003
<b>Totals</b>			<b>1,000,000.00</b>	<b>100.000</b>	<b>28.966</b>

Sources: UIG 2008; USEPA 2012c; du Pont 1971; Jennings 1970

Notes:

MW = molecular weight, g/mole

ppmv = parts per million by volume (10<sup>-6</sup>)

The atmosphere consists of five basic altitude zones: troposphere (sea level to 8 miles), stratosphere (8 to 32 miles), mesosphere (32 to 50 miles), thermosphere (50 to 350 miles), and exosphere (350 to 500 miles). Within the stratosphere is the ozone layer (9 to 22 miles), which absorbs ultraviolet wavelengths; and within the mesosphere is the ionosphere (62 to 190 miles), which reflects shortwave radio signals and produces auroras. These approximate altitude ranges vary with latitude, season, solar activity, and turbulence. GHGs persist mainly in the troposphere and stratosphere – some in the mesosphere – for different lengths of time, ranging from less than 5 years to over 50,000 years, long enough to become well-mixed, meaning that atmospheric concentrations are about the same all over the world, regardless of source locations (USEPA 2012d). Thus, the homogeneous composition of the lower atmosphere is the global setting for climate change.

### **11.1.3.2 Greenhouse Gases**

Gases that trap heat in the atmosphere are called GHGs. Principal GHGs include CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride (SF<sub>6</sub>), and other fluorinated gases including nitrogen trifluoride and hydrofluorinated ethers. GHGs occur naturally because of volcanoes, forest fires, and biological processes such as enteric fermentation and aerobic decomposition. They are also produced by combustion of fuels, industrial processes, agricultural operations, waste management, and land use changes such as loss of farmland to urbanization. The most common GHG from human activity (fuel combustion) is CO<sub>2</sub>, followed by CH<sub>4</sub> and N<sub>2</sub>O. (USEPA 2012d)

Concentration, or abundance, is the amount of a particular gas in the air. Larger GHG emissions lead to higher concentrations in the atmosphere. GHG concentrations are measured in units of parts per million (ppm), parts per billion (ppb), and parts per trillion (ppt). One ppm is equivalent to 1 cubic centimeter (cc) of pure gas diluted in 1 cubic meter of air. Similarly, 1 ppb is 1 cc diluted in 1,000 cubic meters, and 1 ppt is 1 cc diluted in 1,000,000 cubic meters. (USEPA 2012d)

#### **11.1.3.2.1 Carbon Dioxide**

CO<sub>2</sub> enters the atmosphere through burning fossil fuels (coal, natural gas, and petroleum products), decomposition of solid waste, trees and wood products, fermentation, and also as a result of certain chemical reactions, such as manufacture of cement. CO<sub>2</sub> is removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biologic carbon cycle. In the carbon cycle, carbon in various molecular forms is cycled among atmospheric, oceanic, land biotic, marine biotic, and mineral reservoirs. Atmospheric CO<sub>2</sub> is part of this global carbon cycle. CO<sub>2</sub> concentrations in the atmosphere have increased from about 280 ppm in preindustrial times to about 390 ppm today, a 39 percent increase. The IPCC notes that "this concentration has not been exceeded during the past 420,000 years, and likely not during the past 20 million years. The rate of increase over the past century is unprecedented, at least during the past 20,000 years." The IPCC definitively states that "the present atmospheric CO<sub>2</sub> increase is caused by anthropogenic emissions of CO<sub>2</sub>." (USEPA 2012d; IPCC 2007)

Global Warming Potential (GWP) is a quantified measure of the globally averaged relative radiative forcing impacts of a particular GHG. It is defined as the cumulative radiative forcing both direct and indirect effects integrated over a period of time from the emission of a unit mass of gas relative to a reference gas. CO<sub>2</sub> is the reference gas with a GWP of unity (1). Carbon dioxide equivalents (CO<sub>2</sub>e) are calculated by summing the products of mass GHG emissions by species times their respective USEPA official GWP coefficients. The persistence of CO<sub>2</sub> in the atmosphere is estimated to be in the range of 50 to 200 years, depending on variations in the carbon cycle. (USEPA 2012c, 2012d, 2014b)

#### 11.1.3.2.2 Methane

CH<sub>4</sub> is primarily produced through anaerobic decomposition of organic matter in biological systems. Agricultural processes such as wetland rice cultivation, enteric fermentation in ruminant animals (e.g., cows), and the decomposition of animal wastes emit CH<sub>4</sub>, as does the decomposition of municipal solid wastes. CH<sub>4</sub> is also fugitively emitted during the production and distribution of natural gas and petroleum, and is released as a by-product of coal mining and incomplete fossil fuel combustion. Pipeline-quality natural gas is over 90 percent CH<sub>4</sub> by volume and is considered a “clean fuel” by industry with CO<sub>2</sub> and water vapor as its main combustion by-products. Atmospheric concentrations of CH<sub>4</sub> have increased by about 160 percent since preindustrial times, although the rate of increase has been declining. The IPCC has estimated that slightly more than half of the current CH<sub>4</sub> flux to the atmosphere is anthropogenic, from human activities such as agriculture, fossil fuel use, and waste disposal. The USEPA’s official GWP coefficient of CH<sub>4</sub> is 21, and its persistence in the atmosphere is estimated to be about 9 to 15 years. (USEPA 2012c, 2012d, 2014b)

#### 11.1.3.2.3 Nitrous Oxide

N<sub>2</sub>O is emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste. Anthropogenic sources of N<sub>2</sub>O emissions include agricultural soils, especially the use of synthetic and manure fertilizers; fossil fuel combustion, especially from mobile combustion; adipic (nylon) and nitric acid production; wastewater treatment and waste combustion; and biomass burning. The atmospheric concentration of N<sub>2</sub>O has increased by about 19 percent since 1750, from a preindustrial value of about 270 to about 320 ppb today, a concentration that has not been exceeded during the last thousand years. The USEPA’s official GWP coefficient of N<sub>2</sub>O is 310, and its persistence in the atmosphere is estimated to be about 110 to 120 years. (USEPA 2012c, 2012d, 2014b)

#### 11.1.3.2.4 Fluorinated Gases

Hydrofluorocarbons, perfluorocarbons, and SF<sub>6</sub> are synthetic, powerful GHGs that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for ozone-depleting substances (e.g., chlorofluorocarbons, hydrochlorofluorocarbons, and halons). In the electric utility industry, SF<sub>6</sub> is used as a dielectric gas in high-voltage equipment, such as switchgear and circuit breakers. As man-made gas, SF<sub>6</sub> in the atmosphere has increased from 0 to about 7 ppt in modern times. Due to their expense, all of these fluorinated gases are typically emitted (lost) in small quantities relative to combustion by-products, but because they are potent GHGs, they are sometimes referred to as “High GWP gases” with estimated persistence in the atmosphere ranging from 1.5 to 50,000 years. Of these, SF<sub>6</sub> is the most potent, with an USEPA official GWP of 23,900 and an estimated persistence of about 3,200 years. (USEPA 2012c, 2012d, 2014b)

#### 11.1.3.3 Emission Sources

The USEPA tracks GHG emissions in the US and publishes the *Inventory of U.S. Greenhouse Gas Emissions and Sinks*, which is updated annually (USEPA 2012c, 2014b). This detailed report contains estimates of the total national GHG emissions and removals associated with human activities in all 50 states. From the current report, the main sources of GHG emissions in the US are identified below (USEPA 2012d):

- > Electric power generation
- > Transportation
- > Industry
- > Commercial and residential
- > Agriculture

Land Use and Forestry offsets (absorbs or sequesters) about 15 percent of GHG emissions nationwide. Land areas can act as GHG sinks (absorbing CO<sub>2</sub> from the atmosphere) or GHG sources. Since 1990, well-managed forests and other lands have absorbed more CO<sub>2</sub> from the atmosphere than they emit.

**11.1.3.4 Mobile Sources**

While stationary sources such as power plants and oil refineries emit large quantities of GHGs, mobile sources, due to their sheer numbers nationwide, also emit significant amounts. Mobile sources include onroad vehicles (e.g., automobiles, trucks, motorcycles), offroad equipment (e.g., earthmovers, cranes, portable pumps, and generators), trains (e.g., freight, passenger, light rail), vessels (e.g., boats, ships, watercraft), and aircraft (e.g., general aviation, commercial, military). Mobile source fuels include gasoline, diesel, heavy fuel oil (large marine vessels), and jet fuel, all of which emit GHGs when combusted.

Mobile sources used in mosquito and/or 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 disease pathogen surveillance. Typical GHG contents of common fuels are presented in Table 11-2.

**Table 11-2 Typical GHG Contents of Common Fuels**

Fuel	CO <sub>2</sub> kg/mmBTU	CH <sub>4</sub> kg/mmBTU	N <sub>2</sub> O kg/mmBTU	CO <sub>2</sub> e lb/mmBTU	Energy BTU/gal	CO <sub>2</sub> e lb/gal
Diesel Fuel No. 2	73.96	0.0105	0.0006	163.97	138,300	22.68
Kerosene	73.19	0.0105	0.0006	162.27	138,700	22.51
Jet Fuel	72.23	0.0105	0.0006	160.17	135,000	21.62
Motor Gasoline	71.35	0.0105	0.0006	158.23	122,600	19.40
Aviation Gasoline	69.15	0.0105	0.0006	153.38	120,200	18.44
Propane	62.22	0.0053	0.0001	137.49	91,300	12.55
Pipeline Natural Gas	53.02	0.0053	0.0001	117.20	—	—

Sources: USEPA 2012c, 2011a

Notes:

BTU = the amount of energy (heat) required to raise 1 pound of liquid water 1 degree Fahrenheit from 39 to 40°F

kg/mmBTU = kilogram(s) per million British Thermal Units

lb/mmBTU = pound(s) per million British Thermal Units

**11.1.3.5 Sensitive Receptors**

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.

None of the GHGs described in Section 11.2.2 are considered toxic; however, all are classified as asphyxiants. Thus, in high enough concentrations in confined spaces they can displace the oxygen in air

and present hazards to industrial workers; however, GHG concentrations in ambient air (see Table 11-1) are far below any danger levels. Therefore, no risk to sensitive receptors or the general public is posed by GHGs emitted to outdoor air, either from stationary or mobile sources.

#### **11.1.4 California Climate Impacts**

Climate change is already affecting California. Average temperatures have increased, leading to more extreme hot days and fewer cold nights. Shifts in the water cycle have been observed, with less winter precipitation falling as snow, and both snowmelt and rainwater running off earlier in the year. Sea levels have risen. Wildland fires are becoming more frequent and intense due to dry seasons that start earlier and end later. These climate-driven changes affect resources critical to the health and prosperity of California. (CEC 2010)

If the state takes no action to reduce or minimize expected impacts from future climate change, the costs could be severe. In November 2008, the Governor directed the California Natural Resources Agency to develop a climate adaptation strategy for California. The Natural Resources Agency coordinated with ten state agencies, multiple scientists, a consulting team, and stakeholders to develop the first statewide, multisector adaptation strategy in the country. The resulting report, *2009 California Climate Adaptation Strategy*, summarizes the best-known science to assess the vulnerability of the state to climate change impacts, and outlines possible solutions that can be implemented within and across state agencies to promote resiliency. This strategy is the first step in an evolving process to reduce California's vulnerability to climate change impacts. (CEC 2010)

The Global Warming Solutions Act of 2006 (Assembly Bill [AB] 32) (see Appendix C) required CARB to prepare a Scoping Plan to achieve substantial GHG emissions reductions, both from within the state and from "exported" emissions, such as importing electric power generated at coal-fired power plants located in neighboring western states. The 2008 Scoping Plan outlines a wide range of strategies for reducing statewide GHG emissions to 1990 levels by 2020. This goal will be achieved by cutting about 30 percent from business-as-usual emission levels projected for 2020, or about 15 percent from 2008 levels. Allowing for population growth, the goal is to reduce annual per capita emissions from 14 metric tonnes (MT) CO<sub>2e</sub> down to about 10 MT CO<sub>2e</sub> per capita by 2020. (CARB 2008b)

#### **11.1.5 Emissions Inventories**

The bulk of mosquito and vector control activity emissions would occur in the Bay Area portion of the District's Service Area (i.e., Marin and Sonoma counties), and only minor amounts would occur in Yolo, Solano, Lake, and Mendocino counties within the Program Area. Therefore, the comprehensive 2007 Bay Area GHG inventory is used as the regional benchmark for comparison purposes.

Table 11-3 shows aggregated national, state, and regional GHG emissions for all sources on a gross basis (i.e., CO<sub>2e</sub> emissions only, not including CO<sub>2</sub> sinks such as forestry and agriculture) bracketing the 2007 BAAQMD GHG inventory by 2 years, i.e., from 2005 through 2009. As shown, California accounts for about 7 percent of gross CO<sub>2e</sub> emissions in the US annually, and the Bay Area accounts for about 20 percent of gross CO<sub>2e</sub> emissions in California.

**Table 11-3 Greenhouse Gas Emissions Inventories - Gross Basis**

Summary Year	National MMT CO <sub>2</sub> e	California MMT CO <sub>2</sub> e	Bay Area MMT CO <sub>2</sub> e
2005	7,204	482.5	—
2006	7,159	481.9	—
2007	7,253	488.8	95.8
2008	7,048	484.7	—
2009	6,608	456.8	—
<b>5-Year Average</b>	<b>7,054</b>	<b>478.9</b>	—
<b>Average Annual Variation</b>	<b>2.6%</b>	<b>1.8%</b>	—

Sources: USEPA 2012c; CARB 2011; BAAQMD 2010c

Notes:

MMT - million metric tonnes (annual); 1 metric tonne = 1,000 kilograms or 2,204.6 pounds

2009 is most recent CARB published data; Bay Area for 2007 only

The bulk of the District’s GHG emissions would occur in the San Francisco Bay Area. Tables 11-4, 11-5, 11-6, and 11-7 present progressively focused Bay Area GHG emissions inventory data for 2007 broken down by sectors, counties, and applicable subsectors. The District’s Program Area counties within the BAAQMD are shown in bold. This information will be used as a basis for comparisons with estimated mosquito and vector control activity emissions for the District presented in Section 11.2.2.

**Table 11-4 Bay Area GHG Emissions by Sector**

End-Use Sector	District Emissions Percent	District Emissions MMT CO <sub>2</sub> e
Industrial / Commercial	36.4%	34.9
Residential Fuel Use	7.1%	6.8
Local Electric Power Generation	8.5%	8.1
Imported Electric Power Generation	7.4%	7.1
Offroad Equipment	3.0%	2.9
Transportation	36.4%	34.9
Agriculture / Farming	1.2%	1.1
<b>Totals</b>	<b>100.0%</b>	<b>95.8</b>

Source: BAAQMD 2010c

Notes:

MMT - million metric tonnes (annual); 1 metric tonne = 1,000 kilograms or 2,204.6 pounds



**Table 11-5 Bay Area GHG Emissions by County**

County	District Emissions Percent	District Emissions MMT CO <sub>2</sub> e
Alameda	16.4%	15.7
Contra Costa	32.9%	31.5
<b>Marin</b>	<b>2.8%</b>	<b>2.7</b>
Napa	1.8%	1.7
San Francisco	7.4%	7.1
San Mateo	8.9%	8.5
Santa Clara	19.6%	18.8
<b>Solano (within BAAQMD)</b>	<b>5.9%</b>	<b>5.7</b>
<b>Sonoma (within BAAQMD)</b>	<b>4.3%</b>	<b>4.1</b>
<b>Totals</b>	<b>100.0%</b>	<b>95.8</b>

Source: BAAQMD 2010c

Notes:

MMT - million metric tonnes (annual); 1 metric tonne = 1,000 kilograms or 2,204.6 pounds

**Table 11-6 Mobile Sectors GHG Emissions by County**

County	Offroad MT CO <sub>2</sub> e	Transportation MT CO <sub>2</sub> e
Alameda	569,000	8,351,000
Contra Costa	406,000	4,998,000
<b>Marin</b>	<b>99,000</b>	<b>1,286,000</b>
Napa	50,000	917,000
San Francisco	415,000	2,673,000
San Mateo	270,000	4,850,000
Santa Clara	790,000	7,859,000
<b>Solano (within BAAQMD)</b>	<b>147,000</b>	<b>1,834,000</b>
<b>Sonoma (within BAAQMD)</b>	<b>175,000</b>	<b>2,103,000</b>
<b>Totals</b>	<b>2,921,000</b>	<b>34,871,000</b>

Source: BAAQMD 2010c

Notes:

MMT - million metric tonnes (annual); 1 metric tonne = 1,000 kilograms or 2,204.6 pounds

Values rounded to nearest 1,000 tonnes

"Offroad" is offroad equipment category

**Table 11-7 Offroad Subsectors GHG Emissions by County**

<b>County</b>	<b>Utility MT CO<sub>2</sub>e</b>	<b>Commercial MT CO<sub>2</sub>e</b>	<b>Combined MT CO<sub>2</sub>e</b>
Alameda	29,800	49,900	79,700
Contra Costa	20,300	26,900	47,200
<b>Marin</b>	7,900	12,300	20,200
Napa	2,900	4,300	7,200
San Francisco	14,200	43,900	58,100
San Mateo	14,200	27,200	41,400
Santa Clara	32,900	56,500	89,400
<b>Solano (within BAAQMD)</b>	<b>3,900</b>	<b>6,800</b>	<b>10,700</b>
<b>Sonoma (within BAAQMD)</b>	<b>7,800</b>	<b>13,500</b>	<b>21,300</b>
<b>Totals</b>	<b>133,900</b>	<b>241,300</b>	<b>375,200</b>

Source: BAAQMD 2010c

Notes:

MMT - million metric tonnes (annual); 1 metric tonne = 1,000 kilograms or 2,204.6 pounds

Values rounded to nearest 100 tonnes

"Utility" is small landscaping equipment selected for comparisons to Districts' activities

"Commercial" is light commercial equipment selected for comparisons to Districts' activities

### **11.1.6 Potential for Mitigation**

With respect to mosquito and vector control activities, BMPs include fuel conservation, which minimizes GHG emissions by the Program, as described in Section 11.2.11.

### **11.1.7 Regulatory Setting**

Currently, no local, state, or federal regulatory standards directly apply to GHG emissions from temporary or intermittent mobile sources such as mosquito and vector control activities. However, in the context of the Scoping Plan discussed in Section 11.1.4.1, implementation of Low Carbon Fuel Standard (Executive Order S-1-7, below) would indirectly apply to mosquito and vector control activities via fuel usage.

Principal federal, state, and local GHG statutes, regulations, and programs that affect other types of sources are presented in Appendix C with the CEQA Guidelines summarized below in Section 11.1.7.3.

#### **11.1.7.1 *Federal***

##### **11.1.7.1.1 40 CFR Part 98 – Greenhouse Gas Reporting**

On October 30, 2009, the USEPA issued the Mandatory Reporting of Greenhouse Gases rule (74 FR 56260, 40 CFR 98, effective December 29, 2009), which requires reporting of GHG data and other relevant information from large sources and suppliers in the United States pursuant to Fiscal Year 2008 Consolidated Appropriations Act (HR 2764; Public Law 110-161).

The new rule facilitates collection of accurate and comprehensive emissions data to provide a basis for future USEPA policy decisions and regulatory initiatives. The rule requires specified industrial source categories and facilities with an aggregated heat input of 30 mmBTU or more per hour or that emit 25,000 metric tons or more per year of GHG to submit annual reports to the USEPA. The gases covered by the rule are CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, and hydrofluorocarbons, perfluorocarbons, SF<sub>6</sub>, and other fluorinated gases

including nitrogen trifluoride and hydrofluorinated ethers. Since the Program does not meet the definition of an affected stationary source (i.e., mobile sources only), the GHG reporting rule does not apply.

Notwithstanding the GHG reporting rule, no federal regulations currently limit or curtail GHG emissions of CO<sub>2</sub> and CH<sub>4</sub>, and USEPA cap-and-trade programs currently apply only to acid rain precursors SO<sub>2</sub> and NO<sub>x</sub> (USEPA 2012e). However, N<sub>2</sub>O emissions are regulated, albeit indirectly, through limitation of NO<sub>x</sub> emissions as a criteria pollutant under New Source Performance Standards (NSPS) and federal, state, and local operating permits.

#### **11.1.7.1.2 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. Since GHGs are not regulated criteria air pollutants and the Program is not federally sponsored, permitted, or funded actions, General Conformity does not apply.

#### **11.1.7.2 State**

##### **11.1.7.2.1 Global Warming Solutions Act**

The Global Warming Solutions Act of 2006 (AB 32) codifies California's goal of reducing statewide GHG emissions to 1990 levels by 2020. This reduction will be accomplished through an enforceable statewide cap on global warming emissions that was phased in starting in 2012 to achieve maximum technologically feasible and cost-effective GHG emission reductions. To effectively implement the cap, AB 32 directs CARB to develop appropriate regulations and establish a mandatory reporting system to track and monitor global warming emissions levels.

On September 25, 2009, CARB adopted the AB 32 Cost of Implementation Fee Regulation (Health and Safety Code 38597). The regulation was approved by the Office of Administrative Law on June 17, 2010, and became effective on July 19, 2010. For the first year of the fee program, CARB administratively provided compliance flexibility and did not enforce reporting and fee requirements until after the passage of the state budget for fiscal year 2010-11. Until CARB provides detailed compliance criteria, facilities subject to the regulation do not need to pay fees or report information required by the regulation. However, since the Program is not affected by stationary sources, the AB 32 fee regulation does not apply.

##### **11.1.7.2.2 Cap and Trade**

CARB's new "Cap and Trade" regulation (Subchapter 10, Article 5, Sections 95800 to 96023, Title 17, CCR) is a set of rules (effective September 1, 2012) that establishes a limit on GHG emissions from the largest sources of GHGs in the state. The purpose of *California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms* is to reduce GHG emissions from affected stationary sources through the establishment, administration, and enforcement of an aggregate GHG allowance budget and to provide a trading mechanism for compliance instruments (i.e., "GHG allowances" or "carbon credits"). Since the Program is not affected by stationary sources under the rule, Cap and Trade does not apply. No other statewide quantitative standards of significance for GHG impacts have been established for nonaffected sources under CEQA.

##### **11.1.7.2.3 Assembly Bill 939**

California AB 939, known as the Integrated Waste Management Act of 1989, was enacted due to increasing waste stream volumes and decreasing landfill capacities in the state. As a result of AB 939, the California Integrated Waste Management Board was created. A disposal reporting system with its oversight was established, and facility and program planning was required. AB 939 mandated that

sanitation districts (jurisdictions) meet diversion goals of 25 percent by 1995 and 50 percent by 2000, primarily through recyclables collection and green waste composting. AB 939 also established an integrated framework for program implementation, solid waste planning, and solid waste facility and landfill compliance.

#### **11.1.7.2.4 Senate Bill 1368**

California Senate Bill (SB) 1368 adds Sections 8340 and 8341 to the Public Utilities Code (effective January 1, 2007) with the intent “to prevent long-term investments in power plants with GHG emissions in excess of those produced by a combined-cycle natural gas power plant” with the aim of “reducing emissions of GHGs from the state's electricity consumption, not just the state's electricity production.” SB 1368 provides a mechanism for reducing the GHG emissions of electricity providers, both in state and out of state, thereby assisting CARB in meeting its mandate under AB 32, the Global Warming Solutions Act of 2006.

#### **11.1.7.2.5 Senate Bill 97**

California SB 97 directs the Office of Planning and Research to prepare, develop, and transmit to the Resources Agency CEQA guidelines for the feasible mitigation of GHG emissions or their effects by July 1, 2009. The Resources Agency was required to certify or adopt those guidelines by January 1, 2010. SB 97 also protects, for a short time, certain projects funded by the Highway Safety, Traffic Reduction, Air Quality and Port Security Bond Act of 2006, or the Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1B or 1E) from claims of inadequate analysis of GHGs as a legitimate cause of action. This latter provision was repealed on January 1, 2010.

#### **11.1.7.2.6 Senate Bill 375**

California SB 375 aims to reduce GHG emissions by curbing sprawl, because the largest sources of GHG emissions in California are passenger vehicles and light trucks. SB 375 provides emission reduction goals for which regions can plan, integrates disjointed planning activities, and provides incentives for local governments and developers to follow new conscientiously planned growth patterns. SB 375 enhances CARB's ability to reach AB 32 goals by requiring metropolitan planning organizations to include defined sustainable community strategies in their regional transportation plans for the purpose of reducing GHG emissions, aligns planning for transportation and housing, and creates specified incentives for the implementation of the strategies.

#### **11.1.7.2.7 Senate Bills 1078 and 10**

California SB 1078 was signed into legislation in 2002 and required California load-serving entities (electric utilities) to procure 20 percent of their retail customer load with renewable energy by the year 2017. Four years later (2006), SB 10 accelerated the 20 percent renewable deadline to 2010.

#### **11.1.7.2.8 Executive Order S-20-04**

On July 27, 2004, Executive Order S-20-04 was issued committing the state to aggressive action to reduce state-owned building electricity usage by retrofitting, building, and operating the most energy and resource efficient buildings by taking all cost-effective measures described in the Green Building Action Plan with the goal of reducing grid-based energy purchases by 20 percent by 2015. This order also directed the California Public Utilities Commission to support a campaign to improve commercial building energy efficiency to help achieve the 20 percent goal and to develop a benchmarking methodology.

#### **11.1.7.2.9 Executive Order S-3-05**

On June 1, 2005, Executive Order S-3-05 was issued establishing GHG emission reduction targets: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; and by 2050, reduce GHG emissions to 80 percent below 1990 levels.

#### 11.1.7.2.10 Executive Order S-1-07

On January 18, 2007, the Low Carbon Fuel Standard (LCFS) was issued mandating a reduction of at least 10 percent in the carbon intensity of California's transportation fuels by 2020. It instructed the California Environmental Protection Agency to coordinate activities among the University of California, the California Energy Commission (CEC), and other state agencies to develop and propose a draft compliance schedule to meet the 2020 target. Furthermore, it directed CARB to consider initiating regulatory proceedings to establish and implement the LCFS. In response, CARB identified the LCFS as an early action item with a regulation to be adopted and implemented by 2010.

#### 11.1.7.2.11 Executive Order S-13-08

On November 14, 2008, Executive Order S-20-04 was issued directing the California Resources Agency, in cooperation with the California Department of Water Resources, the CEC, California's coastal management agencies, and the Ocean Protection Council to request that the National Academy of Sciences convene an independent panel to complete the first California Sea Level Rise Assessment Report by December 1, 2010. As part of this effort, the Resources Agency is to create an independent sea-level rise science and policy committee made up of state, national, and international experts and to hold public workshops to gather policy-relevant information.

### 11.1.7.3 Local

#### 11.1.7.3.1 BAAQMD CEQA Guidelines

On June 2, 2010, the BAAQMD Board adopted a significant update to its December 1999 *CEQA Air Quality Guidelines*. BAAQMD issued clarifications and minor edits to the June 2010 guidelines. *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 and GHG impacts. (BAAQMD 2011, 2012)

However, due to a legal challenge,<sup>1</sup> the adopted 2011 Guidelines and significance thresholds (BAAQMD 2011) are no longer officially in effect. Per the revised and adopted 2012 Guidelines (BAAQMD 2012), lead agencies have the discretion to use either the adopted 1999 thresholds or the more stringent 2010/2011 thresholds.<sup>2</sup> At the District's request, the GHG analysis will follow the 2010/2011 significance thresholds because the District has determined that Appendix D of the guidelines, in combination with the

<sup>1</sup> On March 5, 2012, the 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.

<sup>2</sup> Due to the March 5, 2012, writ of mandate, which set 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, BAAQMD cannot and does not endorse or recommend any of the particular thresholds outlined therein.

BAAQMD 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.

The 2010/2011 *CEQA Air Quality Guidelines* do not comprise enforceable rules or regulations per se; nevertheless, the guidelines established the following quantitative thresholds of significance for GHG emissions<sup>3</sup> (see Table 10-3):

- > Stationary Sources: 10,000 MT CO<sub>2</sub>e per year
- > Other than Stationary Sources: 1,100 MT CO<sub>2</sub>e per year or 4.6 MT CO<sub>2</sub>e per SP per year
- > Plans: 6.6 MT CO<sub>2</sub>e per SP per year

Under the 2010/2011 *CEQA Air Quality Guidelines*, Program status would presumably be as follows:

- > Mosquito and vector control activities do not meet the regulatory definition of a stationary source of air contaminants; therefore, the 10,000 MT CO<sub>2</sub>e per year stationary source GHG threshold would not apply.
- > For nonstationary source land use development projects, BAAQMD's adopted "bright-line" threshold of significance differs from other proposed GHG thresholds currently under consideration in California. Under this threshold, to conclude that a project's GHG impacts are less than significant, a project would need to be in compliance with a "Qualified Greenhouse Gas Reduction Strategy," emit less than 1,100 MT CO<sub>2</sub>e per year, or emit less than 4.6 MT CO<sub>2</sub>e per year per capita SP (residents + employees). However, the District's IVMP does not qualify as a land use development project; therefore, these GHG thresholds would not apply.
- > No GHG thresholds exist for temporary construction emissions from mobile and portable sources, neither daily nor annual, whether for stationary or nonstationary source projects. Since mosquito and vector control activities comprise mobile and portable sources similar to construction, no quantitative GHG significance thresholds would apply to the Program since activities such as mosquito and vector control are not specified, defined, or addressed in the guidelines.

Notwithstanding the above criteria, for evaluation purposes the estimated maximum annual Program emissions are compared to the 1,100 MT CO<sub>2</sub>e per year significance threshold for projects that are not stationary sources, e.g., mosquito and vector control activities, as presumptive "land use" projects.

#### 11.1.7.3.2 Other Air Districts' CEQA Guidelines

Portions of the District's Service Area are outside the BAAQMD, i.e., in northern Sonoma County, and portions of the Program Area (eastern Solano County, Yolo County, Mendocino County, and Lake County) are in the jurisdiction of other air districts. Neither NSCAPCD, YSAQMD, MCAQMD, nor LCAQMD have applicable CEQA thresholds for GHGs, as discussed below.

Since the southern portion of Sonoma County is within the BAAQMD, NSCAPCD (2014) generally follows BAAQMD guidelines as appropriate for countywide consistency.

The YSAQMD *Handbook for Assessing and Mitigating Air Quality Impacts* (2007) contains Appendix A3.3, Characteristics and Health Effects of Air Pollutants, in which GHGs are briefly discussed. With respect to CEQA, the YSAQMD acknowledges that "the issue of climate change has become increasingly connected to the CEQA process in recent years". Further, the YSAQMD "recommends that impacts to climate change be evaluated for every CEQA project" and cites a "number of helpful resources exist to assist with this evaluation" including the California Air Pollution Control Officers Association (CAPCOA) document *CEQA & Climate Change* (2008). However, the CAPCOA document contains no

<sup>3</sup> MT = metric tonne, 1,000 kilograms or 2,204.6 pounds; SP = Service Population, residents + employees

quantitative criteria for evaluating projects that are not stationary sources or land use developments. Thus, YSAQMD presently has no quantitative GHG thresholds applicable to the Program and the BAAQMD thresholds presumptively apply. (YSAQMD 2013)

On June 2, 2010, the MCAQMD Board adopted GHG thresholds of significance equivalent to the 2010/2011 BAAQMD thresholds described above and shown in Table 10-3 (Plans excluded) (MCAQMD 2010).

LCAQMD (2014) provides a number of “Climate Change Website Links” related to CEQA, but has no specific guidelines or thresholds related to GHGs and the BAAQMD thresholds presumptively apply.

### **11.1.7.3.3 Marin County and Cities Climate Change Related Policies**

Notwithstanding air district CEQA guidelines on GHGs and climate change, many counties and cities in California have developed climate change policies and action plans that are primarily used as planning and operations management tools. As planning tools, the general aim is to implement “smart growth” policies, prevent unmitigated sprawl, conserve energy and water, and reduce automobile dependence – all of which reduce climate impacts either directly or indirectly. As operations management tools, the general aim is to minimize direct and indirect GHG emissions from government operations, mainly through energy conservation.

#### **Marin County**

##### CEQA Guidelines

In Marin County, the CEQA Guidelines must be used in conjunction with the Environmental Impact Review Guidelines (MCCDA 1994) to determine the local policies and procedures to be followed in implementing CEQA. As such, CEQA Guidelines Appendix G, *Environmental Checklist Form*, Section VII (Greenhouse Gases) applies. Further, the updated Countywide Plan (MCCDA 2007a) acknowledges Section VII by advocating “[a] reduced ecological footprint. Marin residents and businesses shall increasingly use renewable energy, fuel-efficient transportation choices, and green building and businesses practices similar to the level of Western Europe.” (MCCDA 2007b)

##### Climate Action Plan

In its *Climate Action Plan 2014 Update* (MCCDA 2014), Marin County acknowledges the consensus among leading scientists that without action to reduce GHG emissions, climate change due to global warming will pose a considerable threat to the environment and to human health and society.

Marin County was one of the first counties in California to take formal action addressing GHG emissions when it adopted the Marin County GHG Reduction Plan in 2006. Measures identified in the GHG Reduction Plan were then incorporated into the Marin Countywide Plan update, which was adopted in 2007. Consistent with AB 32, the 2006 GHG Reduction Plan set a target to reduce GHG emissions from both community and municipal activities in the unincorporated areas of Marin County by at least 15 percent below 1990 levels by 2020. The County government and private sector have invested heavily in energy efficiency, renewable energy, alternative fuel vehicles, water conservation, and waste minimization to reduce GHG emissions substantially. By 2012, the County had already reduced community emissions to 15 percent below 1990 levels – 8 years ahead of the 2020 target. (MCCDA 2014)

The 2014 Update builds on the 2006 GHG Reduction Plan and includes two targets: (1) the 2020 Community Emissions Reduction Target – a goal to reduce GHG emissions from community activities in the unincorporated areas of Marin County by at least 30 percent below 1990 levels by 2020; and (2) the 2020 Municipal Emissions Reduction Target – a goal to reduce GHG emissions from the County’s municipal activities by at least 15 percent below 1990 levels by 2020. (MCCDA 2014)

### Countywide Plan (General Plan)

The updated Marin Countywide Plan was adopted November 6, 2007. The updated Plan promotes leading edge strategies started in 1974 when Marin County set in place policies that prevented runaway development and protected open space. By focusing on sustainability, the updated Plan also serves as a model for other communities to address the impending climate change crisis – including assessing GHG emissions, setting targets to reduce emissions, and programs to plan for and adapt to projected sea-level rise.

The Plan acknowledges that much of the County's built environment is powered by fossil fuels, which emit GHGs that contribute to climate change. The Plan recognizes that the County must retrofit existing buildings and increase the use of fuel-efficient transportation to realize a significant energy reduction. The Plan calls for environmentally friendly building techniques and energy efficiency standards in excess of state requirements. Other innovations include the goal of reducing the County's ecological footprint to Western European levels, and using benchmarks to track progress in implementing the Plan. (MCCDA 2007a)

### City of Belvedere

The City of Belvedere's partnering in the *Marin County Climate Action Plan Update* (MCCDA 2014) supports its overall policy of reducing GHG emissions in concert with applicable city plans, goals, objectives, policies, and programs related to climate change. The Sustainability (SUST) and Resource Conservation Element of the General Plan contains seven sustainability-related goals that aim to reduce direct and indirect GHG emissions (BPBS 2010). To the full extent of its jurisdictional authority, the City will:

- > Incorporate highest standards of green building in City facilities and encourage private property owners to incorporate high standards of energy efficiency and green building.
- > Ensure that future City investments utilize energy and water conserving, efficient, and environmentally friendly technologies as much as possible.
- > Support renewable energy.
- > Reduce GHG emissions from all activities within the City boundaries to support the State's efforts and to mitigate the impact of climate change and sea level rise.
- > Reduce solid waste disposal and increase recycling in line with Marin County's goal of 80 percent waste diversion by 2012 and zero waste generation by 2025.
- > Encourage and facilitate water conservation in public and private use.
- > Reduce automobile emissions; increase transit (ferry and bus) ridership, and improve bicycle and pedestrian circulation; and support the use of alternative fuel and nonmotorized vehicles.

### Town of Corte Madera

The Town of Corte Madera's partnering in the *Marin County Climate Action Plan Update* (MCCDA 2014) supports its overall policy of reducing GHG emissions in concert with applicable city plans, goals, objectives, policies, and programs related to climate change. The Resource Conservation and Sustainability (RCS) Element of the General Plan (CMPD 2009) contains three Goals that aim to reduce direct and indirect GHG emissions: RCS 2 – Reduced consumption of nonrenewable energy sources in Corte Madera; RCS 3 – Reduce existing and future levels of GHG emissions originating from within the community; and RCS 10 – Attainment of air quality standards in the San Francisco Bay Air Basin. Nine RCS policies support these goals (CMPD 2009). To the full extent of its jurisdictional authority, the Town will:

- > Increase energy conservation and efficiency within town buildings.
- > Support the development and utilization of renewable energy.
- > Minimize transportation-related energy consumption.



- > Reduce energy consumption in buildings by balancing energy efficient design with good planning principles.
- > Actively seek to reduce GHG emissions within the Planning Area.
- > Reduce the potential for air quality [and climate change] impact of new development and redevelopment by requiring pedestrian, bicycle, and transit oriented features.
- > Encourage new development and redevelopment of existing sites that will locate mixed land uses near employment and commercial service centers in order to reduce vehicular air pollution [and GHG emissions].
- > Require the incorporation of air quality [and climate change] mitigation measures for development projects.
- > Support the BAAQMD in monitoring air pollutants of concern, the Governor's Office of Planning and Research (OPR) in developing CEQA guidelines related to GHG emissions and energy for all projects, and in meeting federal and state air quality standards.

### Town of Fairfax

The Town of Fairfax's partnering in the *Marin County Climate Action Plan Update* (MCCDA 2014) supports its overall policy of reducing GHG emissions in concert with applicable city plans, goals, objectives, policies, and programs related to climate change. The Conservation (CON) Element of the General Plan (FPD 2012) contains two main Goals that aim to reduce direct and indirect GHG emissions: Energy Conservation & Climate and Air Quality. Five Objectives support these goals: (1) Integrate reduction of the use of nonrenewable energy resources and GHG emissions into planning; (2) reduce consumption of nonrenewable energy resources and reduce GHG emissions by the residents and Town; (3) improve air quality through proper planning and building decisions; (4) improve air quality through appropriate changes to the Municipal Code; and (5) improve air quality through cooperation and coordination with regional, state, federal, and nonprofit agencies. Ten COM policies support these goals and objectives (FPD 2012). To the full extent of its jurisdictional authority, the Town will:

- > Develop and implement a Climate Action Plan (CAP) for Fairfax, including within its scope both the operations of the Town government and the activities of citizens, and including both stationary and mobile sources.
- > Promote zoning to facilitate live/work situations and minimize motorized transit.
- > Encourage green building techniques for all new and remodel construction within the Town of Fairfax.
- > Participate in statewide and countywide efforts toward energy conservation, renewable energy generation and GHG reduction.
- > Implement energy efficiency and use of sustainable energy resources by Town government.
- > Create an infrastructure to facilitate the use of plug-in hybrid electric vehicles (PHEVs) and electric vehicles (EVs).
- > Support development approaches and usage measures near the Town Center to reduce individual motorized transportation requirements.
- > All planning decisions shall require application of existing air quality guidelines and best practices to minimize air quality [and climate change] impacts.
- > Improve air quality [and reduce GHGs] by encouraging green building techniques for all new and remodel construction within the Town of Fairfax.
- > Support air quality [and climate change] initiatives from the State of California.

### City of Larkspur

The City of Larkspur's partnering in the *Marin County Climate Action Plan Update* (MCCDA 2014) supports its overall policy of reducing GHG emissions in concert with applicable city plans, goals, objectives, policies, and programs related to climate change. A Climate Action Plan (LPD 2010) was prepared to support the 2011 General Plan update. The Health and Safety (SAF) Element of the General Plan (LPD 2011) contains two main goals that aim to reduce direct and indirect GHG emissions: SAF 9 – Protect and improve air quality and SAF10 – Reduce GHG gas emissions. Five SAF policies support these goals (LPD 2011). To the full extent of its jurisdictional authority, the City will:

- > Seek to comply with state and federal ambient air quality standards.
- > Seek to reduce auto travel and, thereby, the pollutants from auto emissions.
- > Ensure that traffic generated by new development does not lead to nonattainment of state and federal ambient air quality standards in Marin County.
- > Ensure sufficient buffers between sensitive land uses (e.g., residential, schools, and public facilities) and sources of air pollution. If sufficient buffers cannot be achieved, require adequate mitigation measures to protect sensitive receptors located near emission sources.
- > Maintain a Climate Action Plan that includes a GHG inventory for municipal operations and the community at large and establishes a GHG reduction goal, in compliance with state law.

### City of Mill Valley

The City of Mill Valley's partnering in the *Marin County Climate Action Plan Update* (MCCDA 2014) supports its overall policy of reducing GHG emissions in concert with applicable city plans, goals, objectives, policies, and programs related to climate change. The City is currently working on developing a Climate Action Plan with the community (MVAP 2014). The Climate Action (CL) Element of the General Plan (MVAP 2013) contains three main goals that aim to reduce direct and indirect GHG emissions: CL1 – Climate change and GHG emissions reduction; CL2 – Climate change adaptation and strategies; and CL3 – Zero waste strategies for solid waste management. Five principal CL objectives support these goals (MVAP 2013). To the full extent of its jurisdictional authority, the City will:

- > Promote Clean Energy and Energy Efficiency: Support and provide incentives for using and investing in clean energy and energy efficiency solutions.
- > Establish Carbon Offsets: Offset carbon emissions through carbon credits or allowances, and through natural sequestration methods.
- > Conduct Monitoring: Establish a baseline and monitor the City and community contribution to GHG emissions.
- > Adapt to Climate Change: Ground climate change adaptation strategies in the best-available scientific understanding of hazards, risks, impacts, and vulnerabilities, and make adaptation planning and implementation a City budgeted item and operational priority.
- > Conduct Recycling and Waste Management: Reduce the volume of the waste stream by encouraging recycling and composting and moving toward Zero Waste objectives that minimize or eliminate waste sent to landfills.

City of Novato

The City of Novato's partnering in the *Marin County Climate Action Plan Update* (MCCDA 2014) supports its overall policy of reducing GHG emissions in concert with applicable city plans, goals, objectives, policies, and programs related to climate change. The Climate Change Action Plan (CCAP) Element of the General Plan Update contains ten main goals that aim to reduce direct and indirect GHG emissions (NCDD 2009). To the full extent of its jurisdictional authority, the City will:

- > Reduce emissions from the energy sector through energy efficiency and conservation efforts within municipal and community operations.
- > Reduce emissions associated with energy generation through promotion and support of renewable energy generation and use.
- > Reduce emissions from the built environment through "green building" and urban design principles that minimize the urban heat island effect and reduce energy consumption.
- > Reduce emissions associated with water conveyance and wastewater sources by increasing water conservation.
- > Reduce emissions from transportation sources by promoting use of alternative fuels and efficient use of traditional automobiles.
- > Reduce emissions by decreasing vehicle miles traveled (VMT) within the city through strategic land use and design.
- > Reduce emissions from transportation sources through promotion of nonvehicular modes of travel.
- > Reduce emissions from waste sources.
- > Improve the city's resilience to reduce vulnerability to extreme events resulting from climate change.
- > Implement the Climate Change Action Plan to reduce Novato's GHG emissions by a minimum of 15 percent from the 2005 baseline by 2020 and by a minimum of 40 percent by 2035.

Town of Ross

The Town of Ross' partnering in the *Marin County Climate Action Plan Update* (MCCDA 2014) supports its overall policy of reducing GHG emissions in concert with applicable city plans, goals, objectives, policies, and programs related to climate change. The Natural Environment (NE) Element of the General Plan (RPD 2007) contains Goal 2 – Sustainable Building and Community Practices, which supports measures to reduce resource consumption and improve energy efficiency, thus reducing direct and indirect GHG emissions. A Climate Action Plan (RPD 2011) has been prepared to support the next General Plan update. Nine NE policies support these goals (RPD 2007). To the full extent of its jurisdictional authority, the Town will:

- > Require large houses to limit the energy usage to that of a more moderately sized house as established in design guidelines.
- > Encourage affordable workforce housing and a development pattern that encourages people to walk.
- > Preserve uses in the commercial area of the town that serve local residents and reduce the need to drive to other areas.
- > Choose the most sustainable portion of a site for development and leaving more of a site in its natural condition to reduce land impacts on the natural environment.

- > Establish “Green Building” requirements that require buildings and substantial remodels to be built using “green” building techniques, including recycling of building materials where possible, and to conform to an industry approved certification or rating such as Leadership in Energy and Environmental Design (LEED) Green Building Rating System.
- > Establish irrigation standards for new landscaping to minimize water consumption.
- > Promote water conservation in existing landscaping and domestic uses.
- > Encourage transportation alternatives to the private automobile.
- > Increase the use of renewable energy sources, including solar energy.

#### Town of San Anselmo

The Town of San Anselmo’s partnering in the *Marin County Climate Action Plan Update* (MCCDA 2014) supports its overall policy of reducing GHG emissions in concert with applicable city plans, goals, objectives, policies, and programs related to climate change. The Conservation (CON) Element of the General Plan (SAPD 1989) contains a Smog topic, which states that “The Air Pollution Control District [i.e., BAAQMD] has estimated that if further increases in pollutant emissions were to continue at the rate which occurred during the '50s and '60s there is a strong likelihood that air quality standards in the Ross Valley would be violated a significant number of times per year. For this reason, in addition to those specified in the Circulation Element, it is recommended that further increases in auto travel in the Ross Valley be avoided.” Due to its age (25 years), the General Plan does not address GHGs or climate change per se; however, a Climate Action Plan (SAPD 2011) has been prepared, which contains recommended policies that support GHG reduction goals. To the full extent of its jurisdictional authority, the Town will implement GHG mitigation measures for both community and government operations comprising the following general categories:

- > Natural Systems and Sequestration (excluding Carbon Offsets)
- > Land Use and Transportation
- > Green Building, Energy Efficiency and Renewable Energy
- > Green Purchasing
- > Waste Reduction, Recycling and Zero Waste
- > State Actions
- > Carbon Offsets

#### City of San Rafael

The City of San Rafael’s partnering in the *Marin County Climate Action Plan Update* (MCCDA 2014) supports its overall policy of reducing GHG emissions in concert with applicable city plans, goals, objectives, policies, and programs related to climate change. The new Sustainability (SU) and Conservation (CON) Elements of the General Plan (SRPD 2004) contain three main goals that aim to reduce direct and indirect GHG emissions: (1) to have a sustainable community, one that balances the needs of the environment, the economy and a diverse society; (2) to have municipal operations that are highly resource efficient and anticipate the effects of climate change; and (3) to have conservation and management of resources. Thirteen SU and CON policies support these goals (SRPD 2004). To the full extent of its jurisdictional authority, the City will:

- > Implement General Plan land use policies to increase residential and commercial densities within walking distance of high frequency transit centers and corridors.
- > Encourage decreasing miles traveled in single-occupant vehicles.

- > Promote the use of alternative fuel and fuel-efficient vehicles.
- > Reduce material consumption and waste generation, increase resource reuse and composting of organic waste, and recycle to significantly reduce and ultimately eliminate landfill disposal.
- > Implement municipal programs to demonstrate the City's commitment to sustainability efforts and reducing GHGs.
- > Encourage business, commercial property owners, apartment building owners, and nonprofit organizations to be resource, energy, and water efficient.
- > Promote and encourage residences to be resource, energy, and water efficient by creating incentives and removing obstacles to promote their use.
- > Support the development of renewable and/or efficient generating resources to reduce the County's reliance on nonrenewable energy supplies.
- > Encourage water-conserving practices in businesses, homes, and institutions and increase the use of recycled water.
- > Encourage recycling through provision of recycling containers, and developing and promoting both existing and new programs.
- > Encourage site planning and development practices that reduce energy demand, support transportation alternatives, and incorporate resource- and energy-efficient infrastructure.
- > Encourage the creation of programs such as Transportation Systems Management (TSM), public transit, carpools/ vanpools, ride-match, bicycling, and other alternatives to the energy-inefficient use of vehicles.
- > Promote and serve as an effective leader in implementing conservation practices and incorporating resource-efficient alternatives in government faculties and services.

#### City of Sausalito

The City of Sausalito's partnering in the *Marin County Climate Action Plan Update* (MCCDA 2014) supports its overall policy of reducing GHG emissions in concert with applicable city plans, goals, objectives, policies, and programs related to climate change. The Environmental Quality (EQ) Element of the General Plan (mid-1990s) contains four GHG-related topics: Air Quality, Water Conservation, Energy Conservation, and Solid Waste Conservation and Recycling. Due to its apparent age (c. 20 years), the General Plan does not address GHGs or climate change per se; however, 11 EQ policies support GHG reduction goals (SPD 199X).<sup>4</sup> To the full extent of its jurisdictional authority, the City will:

- > Implement Circulation and Parking Element programs which could reduce vehicular emissions.
- > Encourage business and residential use of clean-burning fuels.
- > Require vehicles purchased by the City to have low emissions and perform routine maintenance to ensure low emissions.
- > Coordinate land use development review with the Marin Municipal Water District (MMWD) to ensure adequate water supplies.
- > Continue to implement the local water conservation ordinance in coordination with the MMWD.
- > Evaluate the use of reclaimed (treated) wastewater for irrigating City landscaping, median strips, and parks.

<sup>4</sup> The apparent 1990s-era document is undated.

- > Coordinate with the MMWD and surrounding communities in discussion of and planning for future water supply and water quality.
- > Convert incandescent street lighting to less energy-intensive fixtures in order to reduce energy consumptions and costs.
- > Encourage new development to utilize passive solar energy methods to reduce energy consumption to the extent feasible consistent with other design considerations such as view retention, glare, and other requirements.
- > Coordinate local recycling and related publicity efforts with the County Solid Waste Management Plan.
- > Continue and expand the existing residential recycling program and establish a commercial recycling program in coordination with the Chamber of Commerce and local businesses.

#### Town of Tiburon

The Town of Tiburon's partnering in the *Marin County Climate Action Plan Update* (MCCDA 2014) supports its overall policy of reducing GHG emissions in concert with applicable city plans, goals, objectives, policies, and programs related to climate change. The Open Space & Conservation (OSC) Element of the General Plan (TPD 2005) contains four GHG-related topics: Water Supply Policies, Air Quality Policies, Solid Waste and Recycling Policies, and Green Building Policies. Due to its age (10 years), the General Plan does not address GHGs or climate change per se; however, nine OSC policies support GHG reduction goals (TPD 2005). To the full extent of its jurisdictional authority, the Town will:

- > Support the efforts of the Marin Municipal Water District (MMWD) to conserve water through enforcement of the Town's water conservation ordinance requiring implementation of water conservation measures.
- > Coordinate planning activities with the MMWD to ensure that both the Town and MMWD have the latest information with respect to land use and water supply planning.
- > Participate in efforts to voluntarily reduce activities that pollute on Spare the Air days and help publicize Spare the Air activities.
- > Encourage reduction of the number of single-occupant vehicle trips and cumulative [GHG] emissions that result from automobile use through implementation of Circulation Element policies.
- > Continue to meet or exceed waste diversion targets set by the State of California.
- > Require as a condition of approval of use permits that businesses prepare and implement waste management plans to maximize recycling, where appropriate.
- > Continue to pursue opportunities to improve energy efficiency and reduce resource consumption in Town-owned facilities and operations.
- > Apply green building principals to the design, construction, and operation of Town-sponsored facilities.
- > Integrate energy efficiency, conservation, and other green building incentives into the zoning, permitting, and building processes.

#### 11.1.7.3.4 Sonoma County and Cities Climate Change Related Policies

Notwithstanding air district CEQA guidelines on GHGs and climate change, many counties and cities in California have developed climate change policies and action plans, which are primarily used as planning and operations management tools. As planning tools, the general aim is to implement “smart growth” policies, prevent unmitigated sprawl, conserve energy and water, and reduce automobile dependence – all of which reduce climate impacts either directly or indirectly. As operations management tools, the general aim is to minimize direct and indirect GHG emissions from government operations, mainly through energy conservation.

#### Sonoma County

##### CEQA Guidelines

In Sonoma County, the CEQA Guidelines are followed for implementing CEQA. As such, CEQA Guidelines Appendix G, Environmental Checklist Form, Section VII (Greenhouse Gases) applies. Further, Chapter 8 of the General Plan Open Space and Resource Conservation Element acknowledges Section VII by defining several objectives related to climate change and GHGs. (SCPRMD 2010)

##### Sonoma County Community Climate Action Plan

The *Sonoma County Community Climate Action Plan* (SCCPC 2008) was prepared by the Sonoma County Climate Protection Campaign (SCCPC), a coalition of cities, agencies, foundations, and private citizens. The nine incorporated cities and towns include Cloverdale, Cotati, Healdsburg, Petaluma, Rohnert Park, Santa Rosa, Sebastopol, Sonoma, and Windsor. Participating agencies include the County of Sonoma, the Sonoma County Water Agency, the Sonoma County Transportation Authority, and the Sonoma County Agriculture Preservation and Open Space District.

The Climate Action Plan is organized by sector: Electricity and Natural Gas (including water, wastewater, efficiency, and new construction); Transportation and Land Use; Agriculture and Forests; and Solid Waste. Solutions for each sector were analyzed using four criteria: (1) potential for significant, rapid GHG emission reductions; (2) cost effectiveness; (3) ability to maintain local control; and (4) political feasibility. The Plan estimates the amount of GHG reductions and the required financial investment associated with each solution, and recommends the entities to implement the solutions. The Plan presents a package of solutions that, when implemented as a large-scale public works project, should meet the goal of reducing GHG emissions – 25 percent below 1990 levels by 2015. All nine Sonoma cities and the County established these goals in 2005. (SCCPC 2008)

Thus, by 2015 Sonoma County should reduce its emissions by 1.4 million metric tonnes (MMT) CO<sub>2e</sub> from the “business as usual” total of 4.2 million tons to reach 2.8 MMT CO<sub>2e</sub> by 2015, which equals the target of 25 percent below the 1990 emission level. Projections of contributions of the major solutions toward the total reduction (i.e., 1.4 MMT CO<sub>2e</sub>) are based on the following assumptions (SCCPC 2008):

- > Energy Efficiency: 80 percent of Sonoma County homes and commercial spaces retrofitted with all economically feasible efficiency improvements.
- > Renewable Energy Production: Build a low carbon electricity portfolio with 67 percent new local renewables including natural gas replacement and efficiency retrofit.
- > Transportation: Trip reduction, average trip length reduction, and shifting from single-occupant vehicles to public transit, walking, and bicycling; large-scale car share fleet of electric and plug-in hybrid vehicles.

Reasonable expectations for implementation of all major quantified solutions indicate that GHG emissions should reach about 22 percent below 1990 levels, which is about 37 percent below business as usual (SCCPC 2008). The remaining 3 percent of reductions would presumably come from minor miscellaneous sources.

### General Plan

The Sonoma County General Plan Open Space and Resource Conservation (OSRC) Element contains Chapter 8, *Air Resources*. Chapter 8 states that the Geysers power plants are the largest stationary sources in Sonoma County. Other stationary sources include mining operations, industrial and agricultural activities, and lumber mills. Residential wood stoves are a major contributor to elevated wintertime particulate levels in urban areas in the north County. (SCPRMD 2010)

Chapter 8 contains several OSRC overall objectives and tailored policies related to climate change and GHGs. Seven of these include (SCPRMD 2010):

- > Minimizing GHG (and criteria pollutant) emissions overall
- > Encouraging reduced motor vehicle use as a means of reducing resultant emissions overall
- > Requiring that development projects be designed to minimize GHG emissions
- > Reducing indirect GHG emissions elsewhere (e.g., power plants) by utilizing construction techniques that decrease the need for space heating and cooling
- > Encouraging public transit, ridesharing and van pooling, shortened and combined motor vehicle trips to work and services, use of bicycles, and walking in order to minimize single passenger motor vehicle use
- > Encouraging the adoption of standards, the development of new technology, and retrofitting to reduce GHG and criteria emissions from geothermal development
- > Requiring that traffic-inducing land use development projects within BAAQMD jurisdiction incorporate GHG and criteria pollutant mitigation measures in their design

### City of Cloverdale

The City of Cloverdale's participation in the *Sonoma County Community Climate Action Plan* (SCCPC 2008) supports its overall goal of reducing GHG emissions in concert with applicable city plans, goals, objectives, policies, and programs related to climate change. The Conservation, Design, and Open Space (CDO) Element of the General Plan (CPCDD 2009) contains Goal CDO-8, which aims to conserve energy and minimize resource depletion by encouraging alternative energy, solar power, and green building techniques, thus reducing GHG emissions. Five CDO policies support this goal (CPCDD 2009). To the full extent of its jurisdictional authority, the City will:

- > Use energy and resource efficient methods in daily City operation. Where feasible, use energy efficient transportation, locally generated solar and alternative power sources, and green building methods for City buildings.
- > Use, support, and encourage energy and resource efficient methods in private construction. The Building Department will provide reviews and inspect using green building standards if requested by any applicant.
- > Study and develop ordinances and incentives to encourage energy efficient transportation, locally generated solar and alternative power sources, and green building methods for private buildings and projects.
- > Study and develop ordinances and incentives to encourage water conservation.
- > Inventory and work to reduce GHG Emissions. The City shall work with the NSCAPCD, CARB, and/or other responsible agencies to prepare a Climate Action Plan.



City of Cotati

The City of Cotati's participation in the *Sonoma County Community Climate Action Plan* (SCCPC 2008) supports its overall goal of reducing GHG emissions in concert with applicable city plans, goals, objectives, policies, and programs related to climate change. The Conservation (CON) Element of the Draft General Plan Update (CPD 2013) contains Goal CON-2, which aims to reduce criteria pollutant and GHG emissions overall. More specifically, Objective CON-2B aims to reduce emissions of GHGs from city operations and community sources. Seven CON policies support this objective (CPD 2013). To the full extent of its jurisdictional authority, the City will:

- > Reduce GHG emissions from City facilities and operations to 30 percent below 1990 levels by 2015, consistent with the goals stated in the 2008 Cotati GHG Emissions Reduction Action Plan.
- > Continue to aggressively implement the GHG reduction measures contained in the 2008 Cotati GHG Emissions Reduction Action Plan.
- > Support the development and implementation of a GHG reduction plan, or Climate Action Plan, that addresses and reduces GHG emissions associated with community operations, including but not limited to: mobile sources, energy consumption, and solid waste.
- > Coordinate with Sonoma County and nearby cities to implement regional GHG reduction plans and consolidate efforts to reduce GHGs throughout the County.
- > Encourage local businesses and industries to engage in voluntary efforts to reduce GHG emissions and energy consumption.
- > Preserve, protect and enhance, as appropriate, the City's carbon sequestration resources, also referred to as "carbon sinks," to improve air quality and reduce net carbon emissions.
- > Encourage public transit, ridesharing and van pooling, shortened and combined motor vehicle trips to work and services, use of bicycles, and walking. Minimize single passenger motor vehicle use.

City of Healdsburg

The City of Healdsburg's participation in the *Sonoma County Community Climate Action Plan* (SCCPC 2008) supports its overall policy of reducing GHG emissions in concert with applicable city plans, goals, objectives, policies, and programs related to climate change. The Natural Resources (NR) Element of the 2030 General Plan (HPD 2011) contains Goal NR-E, which aims to reduce GHG emissions and increase energy efficiency on a community-wide basis. Six NR policies support this goal (HPD 2011). To the full extent of its jurisdictional authority, the City will:

- > Reduce GHGs produced community-wide.
- > Reduce GHG emissions produced by internal municipal operations.
- > Comply with California's Publicly Owned Electric Utilities' Principles Addressing GHG Reduction Goals.
- > Support sustainable development and building practices and lead by example in municipal projects.
- > Encourage the use of large-scale trees in new development to lessen heat build-up from solar radiation.
- > Comply with state climate protection goals and programs to the maximum extent allowed by the City's jurisdictional authority.

### City of Petaluma

The City of Petaluma's participation in the *Sonoma County Community Climate Action Plan* (SCCPC 2008) supports its overall policy of reducing GHG emissions in concert with applicable city plans, goals, objectives, policies, and programs related to climate change. The Natural Environment (NE) Element (Chapter 4) of the 2025 General Plan (PCDD 2008) contains Goal 4-G-6, which aims to reduce the contribution of GHGs to the atmosphere from existing sources and minimize the contribution of GHGs from new construction and sources. Eight NE policies support this goal (PCDD 2008). To the full extent of its jurisdictional authority, the City will:

- > Fund and/or designate a Green Program Manager to oversee implementation of all GHG emissions policies and programs identified in the GHG emissions section as well as the City's Climate Action Plan.
- > Comply with AB 32 and its governing regulations.
- > Implement any additional adopted state legislative or regulatory standards, policies, and practices designed to reduce GHG emissions, as those measures are developed.
- > Prepare a Community Climate Action Plan to identify and prioritize programs, projects, and procedural policies that will help the City achieve the community GHG emission goals of 25 percent below 1990 levels by 2015.
- > Prepare an AB 117 feasibility report for the City of Petaluma forming a Community Choice Aggregation as a way of supplying renewable energy to the community.
- > Train appropriate City staff on new technology and look for opportunities to improve energy efficiency in public facilities.
- > Continue to monitor new technology and innovative sustainable design practices for applicability to insure future development minimizes or eliminates the use of fossil fuel and GHG-emitting energy consumption.
- > Provide information and tips on reducing greenhouse gas emissions to the community.

### City of Rohnert Park

The City of Rohnert Park's participation in the *Sonoma County Community Climate Action Plan* (SCCPC 2008) supports its overall policy of reducing GHG emissions in concert with applicable city plans, goals, objectives, policies, and programs related to climate change. The Environmental Conservation (EC) Element of the General Plan (RPPD 2000) contains Chapter 6.4 – *Air Quality*, which aims to reduce emissions of criteria pollutants, which also reduces GHGs emissions and combats climate change. Due to its age (14 years), the General Plan does not address GHGs or climate change per se. Six EC policies support this goal (RPPD 2000). To the full extent of its jurisdictional authority, the City will:

- > Continue to work toward improving air quality and meeting all federal and state ambient air quality standards and by reducing the generation of air pollutants [and GHGs] both from stationary and mobile sources, where feasible.
- > Encourage land use and transportation strategies that promote use of alternatives to the automobile for transportation, including bicycling, bus transit, and carpooling.
- > Cooperate with the BAAQMD to achieve emissions reductions of nonattainment pollutants [and GHGs], including carbon monoxide, ozone, and PM-10, by implementation of air pollution control measures as required by state and federal statutes.
- > Use the City's development review process and the California Environmental Quality Act (CEQA) regulations to evaluate and mitigate the local and cumulative effects of new development on air quality [and climate change].

- > Prohibit [criteria pollutant and GHG] emission-generating facilities in the Northwest Specific Plan area or in the planned industrial areas in the southeast.
- > Encourage new residential development and remodeled homes to install clean-burning fireplaces and wood stoves [to reduce emissions of particulate matter and GHGs].

#### City of Santa Rosa

The City of Santa Rosa's participation in the *Sonoma County Community Climate Action Plan* (SCCPC 2008) supports its overall policy of reducing GHG emissions in concert with applicable city plans, goals, objectives, policies, and programs related to climate change. The Open Space and Conservation (OSC) Element of the 2035 General Plan (SRCDD 2009) contains Goal OSC-K, which aims to reduce energy use in existing and new commercial, industrial, and public structures; Goal OSC-L, which encourages the development of nontraditional and distributed sources of electrical generation; and Goal OSC-M, which aims to reduce GHG emissions. Nine OSC policies support these goals (SRCDD 2009). To the full extent of its jurisdictional authority, the City will:

- > Promote the use of site planning, solar orientation, cool roofs, and landscaping to decrease summer cooling and winter heating needs. Encourage the use of recycled content construction materials.
- > Identify opportunities for decreasing energy use through installation of energy efficient lighting, reduced thermostat settings, and elimination of unnecessary lighting in public facilities.
- > Identify and implement energy conservation measures that are appropriate for public buildings. Implement measures that are at least as effective as those in the retrofit ordinances for commercial and office buildings.
- > Advance the city's environmentally sensitive preferred purchasing and green fleet conversion programs.
- > Implement measures of the Climate Action Plan that increase energy efficiency, including retrofitting existing buildings and facilitating energy upgrades.
- > Reconsider any existing codes and policies that constrain or prohibit the installation of environmentally acceptable forms of distributed generation.
- > Participate in state and local efforts to develop appropriate policies and review procedures for the installation of photovoltaic solar and other environmentally acceptable forms of distributed generation.
- > Establish a city renewable energy program that will allow the city to generate or receive a significant portion of energy from renewable sources.
- > Meet local, regional, and state targets for reduction of GHG emissions through implementation of the Climate Action Plan.

#### City of Sebastopol

The City of Sebastopol's participation in the *Sonoma County Community Climate Action Plan* (SCCPC 2008) supports its overall policy of reducing GHG emissions in concert with applicable city plans, goals, objectives, policies, and programs related to climate change. The Conservation, Parks, and Open Space (CPOS) Element of the General Plan (SEPD 1994) contains Goal 6 – Energy Conservation and Goal 7 – Air Quality Improvement, which collectively aim to reduce direct and indirect emissions of criteria pollutants and GHGs. Due to its age (20 years), the General Plan does not address GHGs or climate change per se. Six CPOS policies support these goals (SEPD 1994). To the full extent of its jurisdictional authority, the City will:

- > Implement energy conservation measures in new buildings. Reduce energy consumption by requiring structures to meet the energy conservation requirements in the Uniform Building Code and State of California Title 24 regulations.

- > Implement energy conservation measures in existing buildings. Encourage retrofitting of energy-saving features in existing dwellings as part of the City's housing rehabilitation program by providing information, technical assistance, and other incentives.
- > Incorporate energy conservation in the development review process. Make energy conservation an important criterion in the development review process, e.g., solar access, energy efficiency features, utility-sponsored conservation programs.
- > Participate in BAAQMD clean air and climate change planning processes.
- > Promote trip reduction. Reduce the number of single-occupant vehicle trips and the number of vehicle-miles travelled within the planning area to reduce criteria pollutant [and GHG] emissions.
- > Utilize the CEQA process to evaluate and mitigate the local and cumulative effects of new development on air quality [and climate change].

#### City of Sonoma

The City of Sonoma's participation in the *Sonoma County Community Climate Action Plan* (SCCPC 2008) supports its overall policy of reducing GHG emissions in concert with applicable city plans, goals, objectives, policies, and programs related to climate change. The Environmental Resources (ER) Element of the General Plan (SOPD 2006) contains Goal ER-3: Conserve natural resources to ensure their long-term sustainability. Sustainability, among other goals, aims to reduce direct and indirect emissions of GHGs; however, the General Plan does not address GHGs or climate change per se. Three ER policies support this goal (SOPD 2006). To the full extent of its jurisdictional authority, the City will:

- > Increase the conservation-effectiveness and cost-effectiveness of the solid waste source reduction program through expanded recycling and composting.
- > Encourage construction, building maintenance, landscaping, and transportation practices that promote energy and water conservation and reduce GHG emissions.
- > Set an example of sustainability by conserving resources and following green practices in City facilities, services, and projects.

#### Town of Windsor

The Town of Windsor's participation in the *Sonoma County Community Climate Action Plan* (SCCPC 2008) supports its overall policy of reducing GHG emissions in concert with applicable city plans, goals, objectives, policies, and programs related to climate change. The Environmental Resources (ER) Element of the General Plan (WPD 1996) contains Goal 6.G – Air Quality and Goal 6.H – Energy Conservation. These sustainability goals aim to reduce direct and indirect emissions of GHGs; however, the General Plan does not address GHGs or climate change per se. Three ER policies support these goals (WPD 1996). To the full extent of its jurisdictional authority, the Town will:

- > Comply with the state and federal ambient air quality standards and participate in regional efforts to improve air quality (and combat climate change).
- > Encourage land use patterns and management practices that conserve air resources (and reduce GHG impacts).
- > Encourage land use patterns and management practices that conserve energy resources (which reduce direct and indirect GHG emissions).

## 11.2 Environmental Impacts and Mitigations Measures

### 11.2.1 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 on GHG emissions and climate change

The focus in this chapter is on the use of equipment to perform all Program activities and the resulting emissions impacts to generation of GHGs. The CEQA Guidelines are sufficient to cover the issues from public scoping.

As described in Section 11.1.7.3, no promulgated standards of significance exist for GHG impacts established under CEQA for mobile sources such as mosquito and vector control activities. The PEIR addresses the following qualitative criteria are used as standards of significance and are based on CEQA Guidelines Appendix G, Environmental Checklist Form, Section VII.

Would the project:

- > Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?
- > Conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the greenhouse gas emissions?

Determinations made with respect to significance criteria are documented in Sections 11.2.3 through 11.2.8. See Section 11.1.7.3.1 for a discussion of CEQA thresholds of significance for GHGs.

### 11.2.2 Evaluation Methods and Assumptions

As described in Section 11.1.3, operation of onroad fleet vehicles, offroad all-terrain vehicles, watercraft, aircraft, portable equipment, and small equipment would result in GHG emissions in engine exhaust. Detailed lists of equipment, estimated usage, and emission calculations are provided in Appendix C. 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) and USEPA (2011a, 2012c, 2014).

Table 11-8 shows Program alternatives applicability by percentage: surveillance, physical control, vegetation management, biological control, chemical control, or other nonchemical control. Table 11-9 shows land uses associated with selected alternatives: residential, commercial, industrial, agricultural, and open space.

**Table 11-8 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%

Source: Appendix C, Marin/Sonoma Mosquito and Vector Control District

**Table 11-9 Land Uses Associated with Selected Alternatives for Marin/Sonoma Mosquito and Vector Control District**

Residential	Commercial	Industrial	Agricultural	Open Space
•	•	•	•	•

Source: Marin/Sonoma Mosquito and Vector Control District

As described in Section 11.1.7.3, no promulgated standards of significance exist for GHG impacts established under CEQA for mobile sources such as mosquito and vector control activities. However, for evaluation purposes the estimated maximum annual Program emissions are compared to the 1,100 MT CO<sub>2</sub>e per year significance threshold for projects that are not stationary sources, e.g., mosquito and vector control activities, as presumptive “land use” projects. The existing Program activities are the basis for the quantitative evaluation and if compared strictly to existing activities at the time the NOP was published (May 25, 2012), the impact would be no change. Future Program activities would be similar and not result in substantial emission changes over existing conditions.

Tables 11-10 through 11-15 show estimated ongoing annual GHG emissions as CO<sub>2</sub>e by alternative. On the local level, the Program alternatives combined “grand total” of 259 MT CO<sub>2</sub>e per year is below the presumptive 1,100 MT per year threshold and would be less than significant (LS) and would not be cumulatively considerable.

**Table 11-10 Estimated Annual GHG Emissions for Surveillance Alternative for Marin/Sonoma Mosquito and Vector Control District**

CO <sub>2</sub> MT/year	CH <sub>4</sub> MT/year	N <sub>2</sub> O MT/year	CO <sub>2</sub> e MT/year
51.0	0.0024	0.0016	51.6

Sources: CARB 2008a; USEPA 2011a, 2012c

**Table 11-11 Estimated Annual GHG Emissions for Physical Control Alternative for Marin/Sonoma Mosquito and Vector Control District**

CO <sub>2</sub> MT/year	CH <sub>4</sub> MT/year	N <sub>2</sub> O MT/year	CO <sub>2</sub> e MT/year
14.0	0.0007	0.0004	14.1

Sources: CARB 2008a; USEPA 2011a, 2012c

**Table 11-12 Estimated Annual GHG Emissions for Vegetation Management Alternative for Marin/Sonoma Mosquito and Vector Control District**

CO <sub>2</sub> MT/year	CH <sub>4</sub> MT/year	N <sub>2</sub> O MT/year	CO <sub>2</sub> e MT/year
34.5	0.0016	0.0011	34.8

Sources: CARB 2008a; USEPA 2011a, 2012c

**Table 11-13 Estimated Annual GHG Emissions for Biological Control Alternative for Marin/Sonoma Mosquito and Vector Control District**

CO <sub>2</sub> MT/year	CH <sub>4</sub> MT/year	N <sub>2</sub> O MT/year	CO <sub>2</sub> e MT/year
54.4	0.0026	0.0017	55.0

Sources: CARB 2008a; USEPA 2011a, 2012c

**Table 11-14 Estimated Annual GHG Emissions for Chemical Control Alternative for Marin/Sonoma Mosquito and Vector Control District**

CO <sub>2</sub> MT/year	CH <sub>4</sub> MT/year	N <sub>2</sub> O MT/year	CO <sub>2</sub> e MT/year
64.2	0.0030	0.0020	64.9

Sources: CARB 2008a; USEPA 2011a, 2012c

**Table 11-15 Estimated Annual GHG Emissions for Other Nonchemical Alternative for Marin/Sonoma Mosquito and Vector Control District**

CO <sub>2</sub> MT/year	CH <sub>4</sub> MT/year	N <sub>2</sub> O MT/year	CO <sub>2</sub> e MT/year
38.0	0.0018	0.0012	38.4

Sources: CARB 2008a; USEPA 2011a, 2012c

### 11.2.3 Surveillance Alternative

The Surveillance Alternative would be a continuation of existing activities currently practiced by the District 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.

#### **Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?**

GHG emissions from the Surveillance Alternative would be similar to the average emissions shown in Table 11-10. The Surveillance Alternative would emit approximately 52 MT CO<sub>2</sub>e per year, which is below the presumptive 1,100 MT per year threshold and would be less than significant (LS). Due to its small scale and GHG mitigations, the Surveillance Alternative would not individually affect the environment or impede the state's ability to meet its 2020 GHG emission reduction goal because the incremental cumulative impact would not be considerable.

**Impact GHG-1:** Based on estimated annual CO<sub>2</sub>e emissions, the Surveillance Alternative would not result in a cumulatively considerable amount of GHGs, and neither would the incremental contribution of the District. Impacts would be **less than significant** and no mitigation is required.

**Conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the greenhouse gas emissions?**

On a statewide basis, agencies in California are in the process of implementing strategies to reduce GHG emissions pursuant to the Global Warming Solutions Act of 2006 (AB 32, Núñez, Chapter 488, Statutes of 2006), which requires that California reduce its statewide GHG emissions to 1990 levels by 2020. AB 32 required CARB to develop the Scoping Plan (2008b) in coordination with the CEC's Climate Action Team (2010). The Scoping Plan defines a comprehensive set of emission reduction measures such as energy efficiency, renewable energy, cap-and-trade, transportation measures, low-carbon fuels, and targeted GHG fees. Due to its small scale, the Surveillance Alternative would not conflict with state and local plans, policies, or regulations aimed at curbing GHG emissions.

**Impact GHG-2:** Based on the general inclusion of Surveillance Alternative emissions in the local and statewide GHG emission inventories, the Surveillance Alternative would not conflict with applicable plans, policies, or regulations for reducing GHG emissions. Impacts would be **less than significant** and no mitigation is required.

**11.2.4 Physical Control Alternative**

The Physical Control Alternative would be a continuation of existing activities currently practiced by the District 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 and water management. The environmental impact concerns are phrased as questions as follows for the Physical Control Alternative.

**Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?**

GHG emissions from the Physical Control Alternative would be similar to the average emissions shown in Table 11-11. The Physical Control Alternative would emit approximately 14 MT CO<sub>2e</sub> per year, which is below the presumptive 1,100 MT per year threshold and would be less than significant (LS). Due to its small scale and GHG mitigations, the Physical Control Alternative would not individually affect the environment or impede the state's ability to meet its 2020 GHG emission reduction goal because the incremental cumulative impact would not be considerable.

**Impact GHG-3:** Based on estimated annual CO<sub>2e</sub> emissions, the Physical Control Alternative would not result in a cumulatively considerable amount of GHGs, and neither would the incremental contribution of the District. Impacts would be **less than significant** and no mitigation is required.

**Conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the greenhouse gas emissions?**

On a statewide basis, agencies in California are in the process of implementing strategies to reduce GHG emissions pursuant to the Global Warming Solutions Act of 2006 (AB 32, Núñez, Chapter 488, Statutes of 2006), which requires that California reduce its statewide GHG emissions to 1990 levels by 2020. AB 32 required CARB to develop the Scoping Plan (2008b) in coordination with the CEC's Climate Action Team (2010). The Scoping Plan defines a comprehensive set of emission reduction measures such as energy efficiency, renewable energy, cap-and-trade, transportation measures, low-carbon fuels, and targeted GHG fees. Due to its small scale, the Physical Control Alternative would not conflict with state and local plans, policies, or regulations aimed at curbing GHG emissions.

**Impact GHG-4:** Based on the general inclusion of Physical Control Alternative emissions in the local and statewide GHG emission inventories, the Physical Control Alternative would not conflict with applicable plans, policies, or regulations for reducing GHG emissions. Impacts would be **less than significant** and no mitigation is required.



### 11.2.5 Vegetation Management Alternative

The Vegetation Management Alternative would be primarily a continuation of existing activities currently practiced by the District 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 consider applying herbicides in the future to manage or remove vegetation. The environmental impact concerns are phrased as questions as follows for the Vegetation Management Alternative.

#### **Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?**

GHG emissions from the Vegetation Management Alternative would be similar to the average emissions shown in Table 11-12. The Vegetation Management Alternative would emit approximately 35 MT CO<sub>2</sub>e per year, which is below the presumptive 1,100 MT per year threshold and would be less than significant (LS). Due to its small scale and GHG mitigations, the Vegetation Management Alternative would not individually affect the environment or impede the state's ability to meet its 2020 GHG emission reduction goal because the incremental cumulative impact would not be considerable.

**Impact GHG-5:** Based on estimated annual CO<sub>2</sub>e emissions, the Vegetation Management Alternative would not result in a cumulatively considerable amount of GHGs, and neither would the incremental contribution of the District. Impacts would be **less than significant** and no mitigation is required.

#### **Conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the greenhouse gas emissions?**

On a statewide basis, agencies in California are in the process of implementing strategies to reduce GHG emissions pursuant to the Global Warming Solutions Act of 2006 (AB 32, Núñez, Chapter 488, Statutes of 2006), which requires that California reduce its statewide GHG emissions to 1990 levels by 2020. AB 32 required CARB to develop the Scoping Plan (2008b) in coordination with the CEC's Climate Action Team (2010). The Scoping Plan defines a comprehensive set of emission reduction measures such as energy efficiency, renewable energy, cap-and-trade, transportation measures, low-carbon fuels, and targeted GHG fees. Due to its small scale, the Vegetation Management Alternative would not conflict with state and local plans, policies, or regulations aimed at curbing GHG emissions.

**Impact GHG-6:** Based on the general inclusion of Vegetation Management Alternative emissions in the local and statewide GHG emission inventories, the Vegetation Management Alternative would not conflict with applicable plans, policies, or regulations for reducing GHG emissions. Impacts would be **less than significant** and no mitigation is required.

### 11.2.6 Biological Control Alternative

The Biological Control Alternative would be a continuation of existing activities currently practiced by the District using applicable techniques, equipment, and vehicles. It currently involves the use of mosquito predators, specifically, mosquitofish (*Gambusia affinis*), as they are the only commercially available biological control agents at this time. The environmental impact concerns are phrased as questions as follows for the Biological Control Alternative:

#### **Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?**

GHG emissions from the Biological Control Alternative would be similar to the average emissions shown in Table 11-13. The Biological Control Alternative would emit approximately 55 MT CO<sub>2</sub>e per year, which

is below the presumptive 1,100 MT per year threshold and would be less than significant (LS). Due to its small scale and GHG mitigations, the Biological Control Alternative would not individually affect the environment or impede the state's ability to meet its 2020 GHG emission reduction goal because the incremental cumulative impact would not be considerable.

**Impact GHG-7:** Based on estimated annual CO<sub>2</sub>e emissions, the Biological Control Alternative would not result in a cumulatively considerable amount of GHGs, and neither would the incremental contribution of the District. Impacts would be **less than significant** and no mitigation is required.

#### **Conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the greenhouse gas emissions?**

On a statewide basis, agencies in California are in the process of implementing strategies to reduce GHG emissions pursuant to the Global Warming Solutions Act of 2006 (AB 32, Núñez, Chapter 488, Statutes of 2006), which requires that California reduce its statewide GHG emissions to 1990 levels by 2020. AB 32 required CARB to develop the Scoping Plan (2008b) in coordination with the CEC's Climate Action Team (2010). The Scoping Plan defines a comprehensive set of emission reduction measures such as energy efficiency, renewable energy, cap-and-trade, transportation measures, low-carbon fuels, and targeted GHG fees. Due to its small scale, the Biological Control Alternative would not conflict with state and local plans, policies, or regulations aimed at curbing GHG emissions.

**Impact GHG-8:** Based on the general inclusion of Biological Control Alternative emissions in the local and statewide GHG emission inventories, the Biological Control Alternative would not conflict with applicable plans, policies, or regulations for reducing GHG emissions. Impacts would be **less than significant** and no mitigation is required.

#### **11.2.7 Chemical Control Alternative**

The Chemical Control Alternative would be a continuation of existing activities currently practiced by the District using applicable techniques, equipment, vehicles, watercraft, and aircraft. It involves the application of insecticides to reduce vector populations. The environmental impact concerns are phrased as questions as follows for the Chemical Control Alternative.

#### **Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?**

GHG emissions from the Chemical Control Alternative would be similar to the average emissions shown in Table 11-14. The Chemical Control Alternative would emit approximately 65 MT CO<sub>2</sub>e per year, which is below the presumptive 1,100 MT per year threshold and would be less than significant (LS). Due to its small scale and GHG mitigations, the Chemical Control Alternative would not individually affect the environment or impede the state's ability to meet its 2020 GHG emission reduction goal because the incremental cumulative impact would not be considerable.

**Impact GHG-9:** Based on estimated annual CO<sub>2</sub>e emissions, the Chemical Control Alternative would not result in a cumulatively considerable amount of GHGs, and neither would the incremental contribution of the District. Impacts would be **less than significant** and no mitigation is required.

#### **Conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the greenhouse gas emissions?**

On a statewide basis, agencies in California are in the process of implementing strategies to reduce GHG emissions pursuant to the Global Warming Solutions Act of 2006 (AB 32, Núñez, Chapter 488, Statutes of 2006), which requires that California reduce its statewide GHG emissions to 1990 levels by 2020. AB 32 required CARB to develop the Scoping Plan (2008b) in coordination with the CEC's Climate Action Team

(2010). The Scoping Plan defines a comprehensive set of emission reduction measures such as energy efficiency, renewable energy, cap-and-trade, transportation measures, low-carbon fuels, and targeted GHG fees. Due to its small scale, the Chemical Control Alternative would not conflict with state and local plans, policies, or regulations aimed at curbing GHG emissions.

**Impact GHG-10:** Based on the general inclusion of Chemical Control Alternative emissions in the local and statewide GHG emission inventories, the Chemical Control Alternative would not conflict with applicable plans, policies, or regulations for reducing GHG emissions. Impacts would be **less than significant** and no mitigation is required.

### **11.2.8 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. The environmental impact concerns are phrased as questions as follows for the Other Nonchemical Control/Trapping Alternative.

#### **Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?**

GHG emissions from the Other Nonchemical Control/Trapping Control Alternative would be similar to the average emissions shown in Table 11-15. The Other Nonchemical Control/Trapping Control Alternative would emit approximately 38 MT CO<sub>2</sub>e per year, which is below the presumptive 1,100 MT per year threshold and would be less than significant (LS). Due to its small scale and GHG mitigations, the Other Nonchemical Control/Trapping Control Alternative would not individually affect the environment or impede the state's ability to meet its 2020 GHG emission reduction goal because the incremental cumulative impact would not be considerable.

**Impact GHG-11:** Based on estimated annual CO<sub>2</sub>e emissions, the Other Nonchemical Control/Trapping Control Alternative would not result in a cumulatively considerable amount of GHGs, and neither would the incremental contribution of the District. Impacts would be **less than significant** and no mitigation is required.

#### **Conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the greenhouse gas emissions?**

On a statewide basis, agencies in California are in the process of implementing strategies to reduce GHG emissions pursuant to the Global Warming Solutions Act of 2006 (AB 32, Núñez, Chapter 488, Statutes of 2006), which requires that California reduce its statewide GHG emissions to 1990 levels by 2020. AB 32 required CARB to develop the Scoping Plan (2008b) in coordination with the CEC's Climate Action Team (2010). The Scoping Plan defines a comprehensive set of emission reduction measures such as energy efficiency, renewable energy, cap-and-trade, transportation measures, low-carbon fuels, and targeted GHG fees. Due to its small scale, the Other Nonchemical Control/Trapping Control Alternative would not conflict with state and local plans, policies, or regulations aimed at curbing GHG emissions.

**Impact GHG-12:** Based on the general inclusion of Other Nonchemical Control/Trapping Control Alternative emissions in the local and statewide GHG emission inventories, the Other Nonchemical Control/Trapping Control Alternative would not conflict with applicable plans, policies, or regulations for reducing GHG emissions. Impacts would be **less than significant** and no mitigation is required.

### **11.2.9 Cumulative Impacts**

Cumulative impacts from Program alternative GHG emissions are discussed in Section 13.9. Cumulative impacts were assessed in a qualitative manner by determining if the Program alternatives, in conjunction with other approved plans, programs and projects throughout the Program Area, would have the potential to contribute to a long-term cumulative impact on climate change. Given that GHG emissions and climate change are global issues, a statewide framework or cumulative approach for consideration of environmental impacts may be most appropriate. Virtually every project in the state of California, as well as those outside the state, would have GHG emissions.

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)

In summary, all Program alternatives would generate GHG emissions and incrementally contribute to climate change, however minor. When all Program emissions are viewed in combination with global emissions levels that are contributing to the existing cumulative impact on global climate change, the incremental contribution of the Program emissions would not be cumulatively considerable because they occur intermittently on a very small scale (i.e., not stationary sources) and are nevertheless below the presumptive 1,100 MT per year threshold. Therefore, the Program alternatives would not have a cumulatively considerable impact on global climate change. BMPs (see Section 11.2.11) as implemented will reduce Program impacts even further.

### **11.2.10 Environmental Impacts Summary**

Table 11-16 presents a summary of GHG impacts associated with the six alternatives in comparison to existing conditions defined as existing GHG inventories as well as existing conditions as of May-June 2012. The GHG impact callouts correspond to those in Sections 11.2.3 through 11.2.8.

**Table 11-16 Summary of Greenhouse Gas Impacts by Alternative**

Impact Statement	Surveillance	Physical Control	Vegetation Management	Biological Control	Chemical Control	Other Nonchemical/ Trapping
<b>Effects on GHG</b>						
<b>Impact GHG-1:</b> Based on estimated annual CO2e emissions, the Surveillance Alternative would not result in a cumulatively considerable amount of GHGs, and neither would the incremental contribution of the District. Impacts would be <b>less than significant</b> and no mitigation is required.	LS	na	na	na	na	na
<b>Impact GHG-2:</b> Based on the general inclusion of Surveillance Alternative emissions in the local and statewide GHG emission inventories, the Surveillance Alternative would not conflict with applicable plans, policies, or regulations for reducing GHG emissions. Impacts would be <b>less than significant</b> and no mitigation is required.	LS	na	na	na	na	na
<b>Impact GHG-3:</b> Based on estimated annual CO2e emissions, the Physical Control Alternative would not result in a cumulatively considerable amount of GHGs, and neither would the incremental contribution of the District. Impacts would be <b>less than significant</b> and no mitigation is required.	na	LS	na	na	na	na
<b>Impact GHG-4:</b> Based on the general inclusion of Physical Control Alternative emissions in the local and statewide GHG emission inventories, the Physical Control Alternative would not conflict with applicable plans, policies, or regulations for reducing GHG emissions. Impacts would be <b>less than significant</b> and no mitigation is required.	na	LS	na	na	na	na
<b>Impact GHG-5:</b> Based on estimated annual CO2e emissions, the Vegetation Management Alternative would not result in a cumulatively considerable amount of GHGs, and neither would the incremental contribution of the District. Impacts would be <b>less than significant</b> and no mitigation is required.	na	na	LS	na	na	na
<b>Impact GHG-6:</b> Based on the general inclusion of Vegetation Management Alternative emissions in the local and statewide GHG emission inventories, the Vegetation Management Alternative would not conflict with applicable plans, policies, or regulations for reducing GHG emissions. Impacts would be <b>less than significant</b> and no mitigation is required.	na	na	LS	na	na	na

**Table 11-16 Summary of Greenhouse Gas Impacts by Alternative**

Impact Statement	Surveillance	Physical Control	Vegetation Management	Biological Control	Chemical Control	Other Nonchemical/ Trapping
<b>Impact GHG-7:</b> Based on estimated annual CO <sub>2</sub> e emissions, the Biological Control Alternative would not result in a cumulatively considerable amount of GHGs, and neither would the incremental contribution of the District. Impacts would be <b>less than significant</b> and no mitigation is required.	na	na	na	LS	na	na
<b>Impact GHG-8:</b> Based on the general inclusion of Biological Control Alternative emissions in the local and statewide GHG emission inventories, the Biological Control Alternative would not conflict with applicable plans, policies, or regulations for reducing GHG emissions. Impacts would be <b>less than significant</b> and no mitigation is required.	na	na	na	LS	na	na
<b>Impact GHG-9:</b> Based on estimated annual CO <sub>2</sub> e emissions, the Chemical Control Alternative would not result in a cumulatively considerable amount of GHGs, and neither would the incremental contribution of the District. Impacts would be <b>less than significant</b> and no mitigation is required.	na	na	na	na	LS	na
<b>Impact GHG-10:</b> Based on the general inclusion of Chemical Control Alternative emissions in the local and statewide GHG emission inventories, the Chemical Control Alternative would not conflict with applicable plans, policies, or regulations for reducing GHG emissions. Impacts would be <b>less than significant</b> and no mitigation is required.	na	na	na	na	LS	na
<b>Impact GHG-11:</b> Based on estimated annual CO <sub>2</sub> e emissions, the Other Nonchemical Control/Trapping Control Alternative would not result in a cumulatively considerable amount of GHGs, and neither would the incremental contribution of the District. Impacts would be <b>less than significant</b> and no mitigation is required.	na	na	na	na	na	LS

**Table 11-16 Summary of Greenhouse Gas Impacts by Alternative**

Impact Statement	Surveillance	Physical Control	Vegetation Management	Biological Control	Chemical Control	Other Nonchemical/ Trapping
<b>Impact GHG-12:</b> Based on the general inclusion of Other Nonchemical Control/Trapping Control Alternative emissions in the local and statewide GHG emission inventories, the Other Nonchemical Control/Trapping Control Alternative would not conflict with applicable plans, policies, or regulations for reducing GHG emissions. Impacts would be <b>less than significant</b> and no mitigation is required.	na	na	na	na	na	LS

LS = Less-than-significant impact

N = No impact

na = Not applicable

SM = Potentially significant but mitigable impact

SU = Significant and unavoidable impact

### **11.2.11 Mitigation and Monitoring**

All impacts are less than significant (LS) compared to existing conditions and require no mitigation. The District will reduce small impacts even further (under Impacts GHG-1, GHG-3, GHG-5, GHG-7, GHG-9, and GHG-11), as described below based on BMP A14 in Table 2-6.

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.
- > 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.