24. Air Quality

24.1 Introduction

This chapter describes the air quality setting for the Extended, Secondary, and Primary study areas. Descriptions and maps of these three study areas[1] are provided in Chapter 1 Introduction.

The regulatory setting for air quality is discussed briefly in this chapter, and is presented in greater detail in Chapter 4 Environmental Compliance and Permit Summary.

This chapter focuses primarily on the counties in the Primary Study Area, with greatest emphasis on the existing air quality conditions and potential Project-related emissions and impacts in Glenn and Colusa counties. Air quality conditions and potential impacts in the Secondary and Extended study areas were evaluated and discussed qualitatively. Potential local and regional impacts from constructing, operating, and maintaining the alternatives were described and compared to applicable significance thresholds. Mitigation measures are provided for identified significant or potentially significant impacts, where appropriate.

24.2 Environmental Setting/Affected Environment

24.2.1 Extended Study Area

The California Air Resources Board (ARB) and the U.S. Environmental Protection Agency (USEPA) use ambient air quality monitoring data to determine whether geographic areas throughout the State achieve the standards that regulators have established for criteria pollutants[2]. Areas that achieve standards are designated as attainment areas[3], and areas that do not achieve standards are nonattainment areas[4], in accordance with the National Ambient Air Quality Standards (NAAQS)[5] and California Ambient Air Quality Standards (CAAQS)[6]. Table 24-1 lists the NAAQS and CAAQS.

[1] For this resource, the Extended Study Area consists of 39 counties that are located in the following air basins: San Francisco Bay Area, Sacramento Valley, Mountain Counties, San Joaquin Valley, Salton Sea, Mojave Desert, South Coast, North Central Coast, San Diego County, Lake Tahoe, and South Central Coast. The Secondary Study Area consists of 22 counties that are located in the Sacramento Valley Air Basin, San Francisco Bay Area Air Basin, Mountain Counties Air Basin, and North Coast Air Basin. The Primary Study Area consists of portions of the Sacramento Valley Air Basin (SVAB), in Glenn and Colusa counties only.

[2] Criteria Pollutant: An air pollutant for which acceptable levels of exposure can be determined and for which an ambient air quality standard has been set (ARB, 2010). The criteria pollutants are ozone (O_3), carbon monoxide (CO), nitrogen oxides (NOx), sulfur dioxide (SO_2), particulate matter less than 10 microns in aerodynamic diameter (PM_{10}), particulate matter less than 2.5 microns in aerodynamic diameter ($PM_{2.5}$), and lead.

[3] Attainment Area: A geographic area considered to have air quality as good as or better than the national and/or State ambient air quality standards (NAAQS and CAAQS, respectively) (USEPA, 2006).

[4] Nonattainment Area: A geographic area identified by the USEPA and/or ARB as not meeting either NAAQS or CAAQS standards for a given pollutant (ARB, 2010).

[5] NAAQS: Standards established by USEPA that apply to ambient air throughout the country (USEPA, 2006).

[6] California Ambient Air Quality Standard (CAAQS): A legal limit that specifies the maximum level and time of exposure in the ambient air for a given air pollutant and which is protective of human health and public welfare (Health and Safety Code section 39606b). CAAQSs are recommended by the California Office of Environmental Health Hazard Assessment and adopted into regulation by the ARB. CAAQS are the standards which must be met per the requirements of the California Clean Air Act (ARB, 2010).

Table 24-1
Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards (CAAQS)[a]	National Standards (NAAQS)[b]	
			Primary[c]	Secondary[d]
Ozone	8 Hour 1 Hour	0.07 ppm 0.09 ppm	0.075 ppm —	0.075 ppm —
Carbon monoxide	8 Hour 1 Hour	9.0 ppm 20 ppm	9 ppm 35 ppm	— —
Nitrogen dioxide	Annual Arithmetic Mean 1 Hour	0.30 ppm 0.18 ppm	0.053 ppm 100 ppb	0.053 ppm —
Sulfur dioxide[e]	Annual Arithmetic Mean 24 Hour 3 Hour 1 Hour	— 0.04 ppm — 0.25 ppm	0.030 ppm 0.14 ppm — 75 ppb	— — 0.5 ppm —
PM_{10}	Annual Arithmetic Mean 24 Hour	20 µg/m^3 50 µg/m^3	— 150 µg/m^3	— 150 µg/m^3
$PM_{2.5}$[f]	Annual Arithmetic Mean 24 Hour	12 µg/m^3 —	12 µg/m^3 35 µg/m^3	12 µg/m^3 35 µg/m^3
Sulfates	24 Hour	25 µg/m^3	—	—
Lead[g]	30 Day Average Calendar Quarter Rolling 3-Month Average	1.5 µg/m^3 — —	— 1.5 µg/m^3 0.15 µg/m^3	— 1.5 µg/m^3 0.15 µg/m^3
Hydrogen sulfide	1 Hour	0.03 ppm	—	—
Vinyl chloride	24 Hour	0.01 ppm	—	—
Visibility-reducing particles	8 Hour	See Note[h]	—	—

[a]California Ambient Air Quality Standards (CAAQS) for ozone, carbon monoxide, sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, suspended particulate matter (PM_{10}, $PM_{2.5}$, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded.

[b]National Ambient Air Quality Standards (NAAQS), other than ozone, particulate matter, and those based on annual averages or annual arithmetic means, are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest eight hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m^3 is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard.

[c]National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.

[d]National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[e]On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except for areas designated nonattainment for the 1971 standards, where the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

[f]On December 14, 2012, USEPA lowered the federal primary $PM_{2.5}$ annual standard from 15.0 micrograms per cubic meter to 12.0 micrograms per cubic meter.

[g]The national standard for lead was revised on October 15, 2008, to a rolling three-month average. The 1978 lead standard (1.5 µg/m^3 as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except for areas designated nonattainment for the 1978 standard, where the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

[h]Insufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent.

Notes:

ppm = parts per million (by volume)
ppb = parts per billion (by volume)
µg/m^3 = micrograms per cubic meter

Source: ARB, 2012e.

Table 24-2 lists the 39 counties within the Extended Study Area that are designated as nonattainment areas pursuant to the NAAQS and CAAQS. An area may be an attainment area for one pollutant and a non-attainment area for others (USEPA, 2006). The table also lists the air basin and air district for each county. Nonattainment designations are provided for two timeframes: an earlier assessment of nonattainment status based on information available from the USEPA and the State of California in 2009 (the baseline date for the proposed Project), and more current data obtained in 2012.

The relative locations of the air basins, air districts, and proposed Project are shown on Figure 24-1.

Table 24-2
Counties Designated as Nonattainment Areas Pursuant to the National Ambient Air Quality Standards and the California Ambient Air Quality Standards for the Extended Study Area

County	Air Basin	Air District	Federal Nonattainment Designations – NAAQS[c]		State Nonattainment Designations – CAAQS[d]	
			2009 (Source: USEPA, 2009)	2012 (Source: USEPA, 2012a)	2006 (Source: ARB, 2007)	2011 (Source: ARB, 2012b)
Alameda[a]	San Francisco Bay Area	Bay Area	Ozone, $PM_{2.5}$	Ozone, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$
Butte[a]	Sacramento Valley	Butte	Ozone and $PM_{2.5}$ in Chico	Ozone and $PM_{2.5}$ in Chico	Ozone, PM_{10}, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$
Calaveras	Mountain Counties	Calaveras	Ozone	Ozone	Ozone, PM_{10}	Ozone, PM_{10}
Colusa[b]	Sacramento Valley	Colusa			Ozone, PM_{10}	Ozone, PM_{10}
Contra Costa[a]	San Francisco Bay Area	Bay Area	Ozone and $PM_{2.5}$	Ozone and $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$
El Dorado[a]	Sacramento Valley, Lake Tahoe, and Mountain Counties	El Dorado	Ozone and $PM_{2.5}$	Ozone and $PM_{2.5}$	Ozone, PM_{10}	Ozone, PM_{10}
Fresno	San Joaquin Valley	San Joaquin Valley Unified	Ozone, $PM_{2.5}$	Ozone, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$
Glenn[b]	Sacramento Valley	Glenn			Ozone, PM_{10}	Ozone, PM_{10}
Imperial	Salton Sea	Imperial	Ozone, PM_{10}, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$	Ozone, PM_{10}, ($PM_{2.5}$ in Calexico)	Ozone, PM_{10}, ($PM_{2.5}$ in Calexico)
Kern	San Joaquin Valley and Mojave Desert	San Joaquin Valley Unified and Kern	Ozone, $PM_{2.5}$, (PM_{10} in East Kern)	Ozone, $PM_{2.5}$, PM_{10} (in East Kern)	Ozone, PM_{10}, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$ (in San Joaquin Valley air basin)
Kings	San Joaquin Valley	San Joaquin Valley Unified	Ozone, $PM_{2.5}$	Ozone, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$
Los Angeles	South Coast and Mojave Desert	South Coast and Antelope Valley	Ozone, $PM_{10}PM_{2.5}$,	Ozone, PM_{10} (in South Coast air basin), $PM_{2.5}$, Lead (in South Coast air basin)	Ozone, PM_{10}, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$ (in South Coast air basin); NO_x (in South Coast air basin), Lead (in South Coast air basin)

Table 24-2
Counties Designated as Nonattainment Areas Pursuant to the National Ambient Air Quality Standards and the California Ambient Air Quality Standards for the Extended Study Area

County	Air Basin	Air District	Federal Nonattainment Designations – NAAQS[c]		State Nonattainment Designations – CAAQS[d]	
			2009 (Source: USEPA, 2009)	2012 (Source: USEPA, 2012a)	2006 (Source: ARB, 2007)	2011 (Source: ARB, 2012b)
Madera	San Joaquin Valley	San Joaquin Valley Unified	Ozone, $PM_{2.5}$	Ozone, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$
Merced	San Joaquin Valley	San Joaquin Valley Unified	Ozone, $PM_{2.5}$	Ozone, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$
Monterey	North Central Coast	Monterey Bay Unified			Ozone, PM_{10}	Ozone, PM_{10}
Napa	San Francisco Bay Area	Bay Area	Ozone, $PM_{2.5}$	Ozone, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$
Nevada	Mountain Counties	Northern Sierra	Ozone	Ozone (western Nevada)	Ozone, PM_{10}	Ozone, PM_{10}
Orange	South Coast	South Coast	Ozone, PM_{10}, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$, NO_x
Placer[a]	Sacramento Valley, Lake Tahoe and Mountain Counties	Placer	Ozone in Sacramento Metro	Ozone in Sacramento Metro; $PM_{2.5}$	Ozone, PM_{10} $PM_{2.5}$	Ozone, PM_{10}
Plumas	Mountain Counties	Northern Sierra			Ozone, PM_{10} ($PM_{2.5}$ in Portola Valley)	PM_{10} ($PM_{2.5}$ in Portola Valley)
Riverside	Salton Sea, South Coast, and Mojave Desert	South Coast and Mojave Desert	Ozone, PM_{10}, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$ (in South Coast air basin), NO_x (in South Coast air basin)
Sacramento[a]	Sacramento Valley	Sacramento Metro	Ozone, PM_{10}, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$
San Benito	North Central Coast	Monterey Bay Unified			Ozone, PM_{10}	Ozone, PM_{10}
San Bernardino	Mojave Desert and South Coast	South Coast and Mojave Desert	Ozone, PM_{10}, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$
San Diego	San Diego County	San Diego	Ozone in San Diego	Ozone in San Diego	Ozone, PM_{10}, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$
San Joaquin	San Joaquin Valley	San Joaquin Valley Unified	Ozone, $PM_{2.5}$	Ozone, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$
San Luis Obispo	South Central Coast	San Luis Obispo		Ozone	Ozone, PM_{10}	Ozone, PM_{10}
Santa Barbara	South Central Coast	Santa Barbara			Ozone, PM_{10}	Ozone, PM_{10}
Santa Clara[a]	San Francisco Bay Area	Bay Area	Ozone, $PM_{2.5}$	Ozone, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$

Table 24-2
Counties Designated as Nonattainment Areas Pursuant to the National Ambient Air Quality Standards and the California Ambient Air Quality Standards for the Extended Study Area

County	Air Basin	Air District	Federal Nonattainment Designations – NAAQS[c]		State Nonattainment Designations – CAAQS[d]	
			2009 (Source: USEPA, 2009)	2012 (Source: USEPA, 2012a)	2006 (Source: ARB, 2007)	2011 (Source: ARB, 2012b)
Santa Cruz	North Central Coast	Monterey Bay Unified			Ozone, PM_{10}	Ozone, PM_{10}
Shasta[a]	Sacramento Valley	Shasta			Ozone, PM_{10}	Ozone, PM_{10}
Solano[a]	Sacramento Valley and San Francisco Bay Area	Yolo-Solano and Bay Area	Ozone, $PM_{2.5}$	Ozone, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$
Stanislaus	San Joaquin Valley	San Joaquin Valley Unified	Ozone, $PM_{2.5}$	Ozone, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$
Sutter[a]	Sacramento Valley	Feather River	Ozone, $PM_{2.5}$	Ozone, $PM_{2.5}$	Ozone, PM_{10}	Ozone, PM_{10}
Tehama[a]	Sacramento Valley	Tehama		Ozone (Tuscan Buttes area)	Ozone, PM_{10}	Ozone, PM_{10}
Tulare	San Joaquin Valley	San Joaquin Valley Unified	Ozone, $PM_{2.5}$	Ozone, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$
Tuolumne	Mountain Counties	Tuolumne	Ozone		Ozone	Ozone
Ventura	South Central Coast	Ventura	Ozone	Ozone	Ozone, PM_{10}, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$
Yolo[a]	Sacramento Valley	Yolo-Solano	Ozone, $PM_{2.5}$	Ozone, $PM_{2.5}$	Ozone, PM_{10}	Ozone, PM_{10}

[a]These counties are located in both the Extended and Secondary study areas.

[b]These two counties (Glenn and Colusa) are located in all three study areas (Extended, Secondary, and Primary).

[c]National Ambient Air Quality Standards

[d]California Ambient Air Quality Standards

Notes:

NO_x = nitrogen oxides.
$PM_{2.5}$ = Includes particles with an aerodynamic diameter less than or equal to a nominal 2.5 microns. This fraction of particulate matter penetrates most deeply into the lungs.
PM_{10} = Particulate matter consisting of small particles with an aerodynamic diameter less than or equal to a nominal 10 microns (about 1/7 the diameter of a single human hair). Their small size allows them to make their way to the air sacs deep within the lungs, where they may be deposited and result in adverse health effects. PM_{10} emissions also cause visibility reduction.

Source: ARB, 2007 and 2012b; USEPA, 2009 and 2012a.

24.2.2 Secondary Study Area

The Secondary Study Area includes lands within 22 counties. Fourteen of the 22 counties in the Secondary Study Area are also located within the Extended Study Area (Table 24-2), and information for these counties is not repeated in Table 24-3. Table 24-3 lists the remaining counties in the Secondary Study Area that are designated as nonattainment areas pursuant to the NAAQS and CAAQS. The table also lists the air basin and air district for each county.

Table 24-3
Counties Designated as Nonattainment Areas Pursuant to the National Ambient Air Quality Standards and the California Ambient Air Quality Standards for the Secondary Study Area[a]

County	Air Basin	Air District	Federal Nonattainment Designations – NAAQS[b]		State Nonattainment Designations – CAAQS[c]	
			2009 (Source: USEPA, 2009)	2012 (Source: USEPA, 2012a)	2006 (Source: ARB, 2007)	2011 (Source: ARB, 2012b)
Del Norte	North Coast	North Coast			PM_{10}	PM_{10}
Humboldt	North Coast	North Coast			PM_{10}	PM_{10}
Marin	San Francisco Bay Area	Bay Area	Ozone and $PM_{2.5}$	Ozone and $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$
San Francisco	San Francisco Bay Area	Bay Area	Ozone and $PM_{2.5}$	Ozone and $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$
San Mateo	San Francisco Bay Area	Bay Area	Ozone and $PM_{2.5}$	Ozone and $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$	Ozone, PM_{10}, $PM_{2.5}$
Sonoma	San Francisco Bay Area and North Coast	Bay Area and Northern Sonoma	Ozone in southern Sonoma County	Ozone and $PM_{2.5}$ in southern Sonoma County	Ozone, PM_{10}, and $PM_{2.5}$ in southern Sonoma County	Ozone, PM_{10}, and $PM_{2.5}$ in southern Sonoma County
Trinity	North Coast	North Coast Unified			Ozone, PM_{10}	PM_{10}
Yuba	Sacramento Valley	Feather River		$PM_{2.5}$	Ozone, PM_{10}	Ozone, PM_{10}

[a]See Table 24-2 for 14 additional counties that are located in both the Extended Study Area and the Secondary Study Area.

[b]National Ambient Air Quality Standards

[c]California Ambient Air Quality Standards

Notes:

$PM_{2.5}$ = Includes particles with an aerodynamic diameter less than or equal to a nominal 2.5 microns. This fraction of particulate matter penetrates most deeply into the lungs.
PM_{10} = Particulate matter consisting of small particles with an aerodynamic diameter less than or equal to a nominal 10 microns (about 1/7 the diameter of a single human hair). Their small size allows them to make their way to the air sacs deep within the lungs, where they may be deposited and result in adverse health effects. PM_{10} emissions also cause visibility reduction.

Source: ARB, 2007 and 2012b; USEPA, 2009 and 2012a.

24.2.3 Primary Study Area

24.2.3.1 Sacramento Valley Air Basin and County Air Quality Characteristics

Table 24-4 provides the State attainment status for each of the criteria pollutants in the two counties (Glenn and Colusa) that comprise the Primary Study Area. Glenn and Colusa counties are designated as unclassified or attainment for all NAAQS. The pollutants of greatest concern in the Primary Study Area are ozone and the ozone precursors, NO_x and reactive organic gases (ROG[7]), primarily from vehicle and equipment exhaust, and particulate matter (PM_{10}) from soil disturbance and wind erosion (fugitive dust). Glenn and Colusa counties are designated as nonattainment for the CAAQS for these pollutants.

[7] The terms ROG (reactive organic gases), VOC (volatile organic compounds), and hydrocarbons (HC) are used synonymously in this document.

Table 24-4
State Attainment Status for the Two Counties that Comprise the Primary Study Area (Glenn and Colusa)

Pollutant	Glenn County		Colusa County	
	2006 State Nonattainment Designations – CAAQS* (Source: ARB, 2007)	2011 State Nonattainment Designations – CAAQS (Source: ARB, 2012b)	2006 State Nonattainment Designations – CAAQS (Source: ARB, 2007)	2011 State Nonattainment Designations – CAAQS (Source: ARB, 2012b)
Ozone	N-T	N	N-T	N-T
$PM_{2.5}$	U	U	U	A
PM_{10}	N	N	N	N
Carbon monoxide	U	U	U	U
Nitrogen dioxide	A	A	A	A
Sulfur dioxide	A	A	A	A
Sulfates	A	A	A	A
Lead	A	A	A	A
Hydrogen sulfide	U	U	U	U
Visibility-reducing particles	U	U	U	U

*California Ambient Air Quality Standards

Notes:

A = Attainment.
N = Nonattainment.
N-T = Nonattainment-Transitional: a subcategory of the nonattainment designation category for State air quality standards that signals progress and implies the area is nearing attainment. Districts with nonattainment-transitional status may revise their attainment plans to delay adoption of control measures if they anticipate attainment without the measures.
$PM_{2.5}$ = Includes particles with an aerodynamic diameter less than or equal to a nominal 2.5 microns. This fraction of particulate matter penetrates most deeply into the lungs.
PM_{10} = Particulate matter consisting of small particles with an aerodynamic diameter less than or equal to a nominal 10 microns (about 1/7 the diameter of a single human hair). Their small size allows them to make their way to the air sacs deep within the lungs, where they may be deposited and result in adverse health effects. PM_{10} emissions also cause visibility reduction.
U = Unclassified.

Source: ARB, 2007 and 2012b.

The ARB compiles annual average emissions of total organic gases, ROG, CO, NO_x, sulfur oxides, particulate matter, PM_{10}, and $PM_{2.5}$ for areas throughout the State. Table 24-5 lists the estimated annual average emission inventory for stationary sources, area-wide sources, and mobile sources for each of these pollutants in 2010 for the Sacramento Valley Air Basin (SVAB), and for Glenn and Colusa counties. As shown, each of the counties' contributions to the emissions was minor, when compared to the emissions for the SVAB as a whole.

The region's topographic features restrict air movement through and out of the basin. As a result, the northern SVAB is highly susceptible to pollutant accumulation over time. In addition, transport of pollutants into the northern SVAB from the Sacramento Metropolitan Area is primarily influenced by air movement northward. These sources contribute to the region's poorest air quality, which typically occurs during the summer months.

Table 24-5
2010 Estimated Annual Average Emissions (tons per day) for the Sacramento Valley Air Basin and Glenn and Colusa Counties

Pollutant	Area		
	2010 SVAB[d]	2010 Glenn County	2010 Colusa County
Stationary Sources[a]			
Total organic gases	176.5	11.3	5.6
Reactive organic gases	32.9	2.9	2.4
Carbon monoxide	52.2	3.5	1.7
Nitrogen oxides	37.8	4.0	5.2
Sulfur oxides	1.6	0.2	0.3
Particulate matter	30.6	2.5	1.9
PM_{10}	18.0	1.4	0.8
$PM_{2.5}$	10.4	0.7	0.3
Area-Wide Sources[b]			
Total organic gases	173.5	21.0	12.4
Reactive organic gases	62.6	5.1	3.0
Carbon monoxide	293.2	31.3	11.2
Nitrogen oxides	9.3	0.1	0.7
Sulfur oxides	0.8	0.0	0.1
Particulate matter	371.2	24.4	30.9
PM_{10}	203.0	13.7	15.9
$PM_{2.5}$	55.4	4.8	3.3
Mobile Sources[c]			
Total organic gases	96.7	2.0	2.0
Reactive organic gases	88.8	1.8	1.8
Carbon monoxide	695.4	12.3	10.5
Nitrogen oxides	202.0	6.4	6.8
Sulfur oxides	1.0	0.0	0.0
Particulate matter	11.4	0.3	0.3
PM_{10}	11.1	0.3	0.3
$PM_{2.5}$	8.9	0.3	0.3

[a]Stationary sources can include fuel combustion, waste disposal, cleaning and surface coating, petroleum production and distribution, and industrial processes.

[b]Area-wide sources include solvent evaporation and miscellaneous processes.

[c]Mobile sources include on-road motor vehicles and other mobile sources.

[d]Sacramento Valley Air Basin

Notes:

$PM_{2.5}$ = Includes particles with an aerodynamic diameter less than or equal to a nominal 2.5 microns. This fraction of particulate matter penetrates most deeply into the lungs.
PM_{10} = Particulate matter consisting of small particles with an aerodynamic diameter less than or equal to a nominal 10 microns (about 1/7 the diameter of a single human hair). Their small size allows them to make their way to the air sacs deep within the lungs, where they may be deposited and result in adverse health effects. PM_{10} emissions also cause visibility reduction.

Source: ARB, 2012a.

Tables 24-6 and 24-7 summarize the ambient concentrations for the nonattainment pollutants ozone and PM_{10} in the Primary Study Area over the eight-year period of 2004 to 2011. Ozone concentrations and the

number of days the ozone standard(s) are exceeded each year are presented in comparison to the State 1-hour and 8-hour standards, and the federal 8-hour standards (data for both the 1997 and 2008 federal 8-hour standards are provided). PM_{10} concentrations are presented in comparison to the State and federal 24-hour standards. The reported data in these tables were taken from the Colusa-Sunrise Boulevard ARB monitoring station in Colusa County, and the Willows East Laurel Street and Willows 720 North Colusa Street ARB monitoring stations in Glenn County.

Table 24-6
Number of Days State 1-Hour and 8-Hour and Federal 8-Hour Ozone Standards Were Exceeded, and Maximum Ozone Concentrations Measured, in Glenn and Colusa Counties (2004 to 2011)

Year	% of Days Monitored[a]	Number of Days Ozone Standard Was Exceeded		Maximum Measured 1-hr and 8-hr Ozone Concentrations (ppm[e])	
		State Standards (Number of Days > 1-Hr; > 8-Hr State Standard)	Federal 8-Hr Standards (Number of Days >1997; >2008 Standards)	1-Hr High	8-Hr High
Glenn County					
2011[c]	89	0; 1	0; 0	0.082	0.072
2010[c]	100	0; 0	0; 0	0.076	0.064
2009[c]	100	0; 4	0; 0	0.085	0.075
2008[c]	99	0; 2	0; 0	0.085	0.071
2007[c]	98	0; 3	0; 2	0.091	0.078
2006[b,d]	80	0; 0	0; 0	0.076	0.066
2005[b]	100	0; 1	0; 0	0.077	0.070
2004[b]	95	0; 1	0; 0	0.084	0.070
Colusa County					
2011	99	0; 0	0; 0	0.090	0.066
2010	98	0; 1	0; 1	0.082	0.076
2009	94	0; 0	0; 0	0.078	0.068
2008	98	0; 6	0; 1	0.091	0.081
2007	97	0; 0	0; 0	0.080	0.067
2006	100	0; 2	0; 1	0.084	0.076
2005	100	0; 2	0; 0	0.085	0.074
2004	99	0; 1	0; 0	0.084	0.073

[a]Based on 1-Hour Year Coverage.

[b]Data from Willows-E Laurel Street ARB monitoring station in Glenn County.

[c]Data from Willows-720 N Colusa Street ARB monitoring station in Glenn County.

[d]Data were available for both Glenn County ARB monitoring stations. The Willows-E Laurel Street station data were assumed to be more representative because this station had a yearly coverage of 80 percent, while the Willows-720 N Colusa station only had a yearly coverage of 18 percent.

[e]Parts per million

Notes:

California 1-hour Ozone Standard = 0.09 ppm (ARB, 2012e).

California 8-hour Ozone Standard = 0.070 ppm (ARB, 2012e). Effective May 17, 2006.

Federal 8-hour Ozone Standard (1997) = 0.08 ppm; the Federal 8-hour Standard was reduced to 0.075 ppm in March 2008 (USEPA, 2008).

The national 1-hour ozone standard was revoked in June 2005 and is no longer in effect.

Source: ARB, 2012c.

Table 24-7
PM_{10} Concentrations in Glenn and Colusa Counties (2004 to 2011)

Year	% of Days Monitored	Number of Days PM_{10} Standard Was Exceeded		Maximum 24-Hr PM_{10} Concentration (µg/m3)[f]		Annual Average PM_{10} Concentration (µg/m3)	
		State 24-Hr	Federal 24-Hr	State	Federal	State	Federal[a]
Glenn County							
2011[d]	100	0	0	49.1	48.1	19.1	19.0
2010[d]	100	0	0	44.5	45.2	16.7	16.5
2009[d]	100	11.8	0	73.1	71.3	20.2	20.0
2008[d]	100	[b]	0	120.4	121.5	[b]	26.8
2007[d]	99	0	0	43	43	20	19.4
2006[c,e]	62	[b]	[b]	77	78	[b]	20.0
2005[c]	98	18.3	0	69	67	21.5	21.1
2004[c]	100	23.7	0	138	135	25.5	25.2
Colusa County							
2011	97	17.6	0	69.7	69.7	21.6	21.1
2010	100	[b]	0	49.8	49.6	[b]	17.0
2009	99	18.4	0	56.6	56.5	22.1	21.7
2008	95	62.4	0	90.3	90.3	30.5	30.4
2007	86	0	0	43	43	22	21.5
2006	75	[b]	[b]	69	68	[b]	19.3
2005	93	25.8	0	92	91	25.5	23.8
2004	91	[b]	[b]	81	81	[b]	18.5

[a]The national annual PM_{10} standard was revoked in December 2006, and is no longer in effect. The statistic shown here applies only to that standard and is included only for retrospective use.

[b]There were insufficient (or no) data available to determine the value.

[c]Data from Willows-E Laurel Street ARB monitoring station in Glenn County.

[d]Data from Willows-720 N Colusa Street ARB monitoring station in Glenn County.

[e]Data were available for both Glenn County ARB monitoring stations. The Willows-E Laurel Street station date were assumed to be more representative because this station had a yearly coverage of 62 percent, while the Willows-720 N Colusa station only had a yearly coverage of 27 percent.

[f]microgram per cubic meter

Notes:

California 24-hour PM_{10} Standard = 50 µg/m3 (ARB, 2012e).
California Annual Arithmetic Mean Standard = 20 µg/m3 (ARB, 2012e).
Federal 24-hour PM_{10} Standard = 150 µg/m3 (ARB, 2012e).

Source: ARB, 2012d.

The higher ozone concentrations, including those that exceed standards, typically occur during the months of May through October in the northern SVAB. NO_x and ROG are chemical precursors for ground-level ozone (or smog) formation. Motor vehicles, power plants, factories, chemical solvents, and various combustion sources are leading emitters of these pollutants.

Table 24-7 shows the PM_{10} concentrations from 2004 to 2011. Particulate matter can cause damage to human lungs when it enters the body through the respiratory system. The extent of the damage depends on the toxicity of the substance and the particle size. Sources of these pollutants include industries that emit airborne pollution, agricultural operations, dust resulting from high winds and soil erosion, dust from construction, vehicular travel on paved and unpaved roads, and vehicular exhaust emissions. As shown in Table 24-7, monitoring stations in both counties recorded PM_{10} levels exceeding the State standard.

In 2011, there were no days in Glenn County when the PM_{10} measurements were above the national or State 24-hour standard. In 2011, there were no days in Colusa County when the PM_{10} measurements were above the national 24-hour standard; there were 17.6 days in 2011 when air in Colusa County exceeded the State 24-hour PM_{10} standard (ARB, 2012d).

24.2.3.2 Regional Haze and Visibility Impairment

Natural and human-caused pollution in the atmosphere can degrade visibility, resulting in what is known as regional haze (ARB, 2008). Particulate pollution, including sulfates, nitrates, organics, soot, fine soil dust, and particles, contribute to the regional haze that impairs visibility, in addition to affecting public health.

24.2.3.3 Toxic Air Contaminant/Hazardous Air Pollutant Emissions

In addition to the criteria air pollutants, toxic air contaminants are another group of airborne pollutants that may be hazardous to human health, even in small quantities. Toxic air contaminants can cause or contribute to an increase in deaths or serious illness, or can pose a present or potential hazard to human health (ARB, 2011). Substances that have been identified as hazardous air pollutants pursuant to Section 112 (b) of the federal Clean Air Act are also included in the ARB list of toxic air contaminants. Toxic air contaminants can cause short-term (acute) and long-term (chronic or carcinogenic) adverse human health effects. They can be emitted from a variety of common sources, including gasoline stations, automobiles, dry cleaners, industrial operations, and painting operations. Agricultural and construction activities can also contribute to toxic air emissions. In 1998, the ARB identified particulate emissions from diesel-fueled engines (i.e., diesel PM) as a toxic air contaminant.

24.2.3.4 Existing Sensitive Receptors

A sensitive receptor is generically defined as a location where human populations (especially children, seniors, or ill persons) are found, and there is reasonable expectation of human exposure to air pollutants of concern. Examples of sensitive receptors include residences, hospitals, day-care centers, and schools. The Primary Study Area is rural, for the most part, with a few residences located near areas proposed for construction.

24.2.3.5 Odors

Odors may result from construction and operation of projects, especially if activities involve or would result in anaerobic decomposition of organic materials. Odors rarely cause physical health effects but may be unpleasant and may result in complaints from the public. Odor impacts vary in frequency and severity, depending on the nature, frequency, and intensity of the source, the wind speed and direction, and the sensitivity and location of the receptors. Projects may result in objectionable odors if located near receptors. Air districts typically regulate odor sources under nuisance regulations, and base the level of significance of odors on the number of complaints received.

24.3 Environmental Impacts/Environmental Consequences

24.3.1 Regulatory Setting

Air quality throughout California is regulated at the federal, State, and local levels. Provided below is a list of the applicable regulations that were in effect as of June 2009. These regulations are discussed in detail in Chapter 4 Environmental Compliance and Permit Summary of this EIR/EIS.

24.3.1.1 Federal Plans, Policies, and Regulations

- Federal Clean Air Act (FCAA)
- National Ambient Air Quality Standards and Federal Air Quality Designations
- Federal General Conformity Requirements[8]
- Prevention of Significant Deterioration/New Source Review and New Source Performance Standards
- Federal Regulations for Hazardous Air Pollutants
- Federal Standards for Mobile Sources

24.3.1.2 State Plans, Policies, and Regulations

- California Clean Air Act (CCAA)
- Mulford-Carrell Act
- California Ambient Air Quality Standards and State Air Quality Designations
- State Implementation Plans
- California Air Toxics Programs
- California Mobile Source Emission Control Programs

24.3.1.3 Regional and Local Plans, Policies, and Regulations

- Regional and Local Air Quality Management Plans
- Local Air District CEQA Guidance Documents Pertaining to Air Quality
- Glenn and Colusa County General Plans

24.3.2 Evaluation Criteria and Significance Thresholds

Significance criteria represent the thresholds used to identify whether an impact would be significant. Appendix G of the *CEQA Guidelines* suggests the following evaluation criteria for air quality:

Would the Project:

- Conflict with or obstruct implementation of the applicable air quality plan?
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation?
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or State ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?
- Expose sensitive receptors to substantial pollutant concentrations?
- Create objectionable odors affecting a substantial number of people?

[8]Glenn and Colusa counties are designated as unclassified or attainment for all the NAAQS, so the general conformity rule does not apply to the Project or alternatives. General conformity applies to only federal actions that are in areas that are designated as nonattainment or maintenance for one or more of the NAAQS.

The evaluation criteria used for this impact analysis represent a combination of the Appendix G criteria and professional judgment that considers current regulations, standards, and/or consultation with agencies, knowledge of the area, and the context and intensity of the environmental effects, as required pursuant to NEPA. For the purposes of this analysis, an alternative would result in a significant impact if it would result in any of the following:

- Conflict with an applicable air quality plan, contribute substantially to an air quality violation, and/or result in a cumulatively considerable net increase of nonattainment pollutants.
- Expose sensitive receptors to substantial pollutant concentrations.
- Create objectionable odors affecting a substantial number of people.

The CEQA Guidelines for air quality in Appendix G indicate that, where available, the thresholds of significance established by the applicable air quality management or air pollution control district may be relied upon to make the significance determinations.

The Tehama County Air Pollution Control District (TCAPCD) has developed specific air quality guidelines and criteria for compliance with CEQA[9] (TCAPCD, 2009). TCAPCD has established recommended significance thresholds for Project construction and/or operation. Projects with the potential to have higher emission levels are subject to increasingly more stringent environmental review and mitigation requirements.

Projects with the potential to exceed ambient air quality standards and projects with the potential to emit toxic or hazardous air pollutants may be required to conduct dispersion modeling and/or a health risk assessment to evaluate modeled emission concentration values, or allow comparison to health-risk related thresholds. Emissions of toxic or hazardous air pollutants would be considered significant if they result in ambient concentrations and human exposures that exceed acceptable levels or contribute significantly to the area's excess lifetime cancer risk values, cancer burden, or health hazard indices.

The pollutants of greatest concern in the Primary Study Area are ozone and the ozone precursors (NO_x and ROG) primarily from vehicle and equipment exhaust, and particulate matter (PM_{10}) from soil disturbance and wind erosion (fugitive dust). Glenn and Colusa counties are designated as nonattainment for the CAAQS for these pollutants, and the significance thresholds established by the nearby local air districts are mass-based emission rates for these pollutants of concern. As a result, the discussion of environmental consequences focuses on NO_x, ROG, and PM_{10} pollutants as indicators of potential Project-related air quality impacts.

The thresholds of significance for these pollutants of concern are presented in Table 24-8. General Conformity de minimis levels are not applicable in Primary Study Area because Glenn and Colusa counties are designated as unclassified or attainment for all NAAQS, and general conformity applies only to federal actions in areas designated as nonattainment or maintenance for any of the NAAQS.

[9] The Glenn County Air Pollution Control District (GCAPCD) does not have CEQA guidelines for assessing air quality impacts; it would instead defer to the Butte County guidelines, if necessary (Ledbetter, 2009). In 2008, the Butte County AQMD published its CEQA Air Quality Handbook, *Guidelines for Assessing Air Quality Impacts for Projects Subject to CEQA Review* (Butte County AQMD, 2008). In addition, the Colusa County Air Pollution Control District (CCAPCD) does not have CEQA guidelines other than its New Source Review rules; thresholds developed by the Tehama County Air Pollution Control District (TCAPCD) would represent similar values (Gomez, 2009). The Butte County and Tehama County thresholds are the same values.

Table 24-8
Tehama County Air Pollution Control District Thresholds of Significance for Criteria Pollutants of Concern

Pollutant	Level A[a]	Level B[b]	Level C[c]
NO_x	≤ 25 lbs/day	> 25 lbs/day	> 137 lbs/day
ROG	≤ 25 lbs/day	> 25 lbs/day	> 137 lbs/day
PM_{10}	≤ 80 lbs/day	> 80 lbs/day	> 137 lbs/day
Level of Significance	Potentially Significant Impacts	Potentially Significant Impacts	Significant Impacts

[a]**Level A:** Any project that has the potential to emit the Level A thresholds would be subject to Standard Mitigation Measures (SMM). Guidelines are recommended to assist in reducing air quality impacts to a level of insignificance.

[b]**Level B: Greater than 25 pounds per day of ROG and/or NO_x and greater than 80 pounds per day of PM_{10} Emissions.** Projects that exceed Level B thresholds have the potential to cause significant air quality impacts, and should be submitted to TCAPCD for review. Projects proponents can select as many Best Available Mitigation Measures (BAMM) as needed, in addition to the recommended list of SMM. If all feasible mitigation measures are incorporated into the Project and emissions are still greater than Level B, additional mitigation measures, including off-site mitigation, may be required.

[c]**Level C: Greater than 137 pounds per day of Emissions.** If emissions from a Project would exceed the Level C thresholds, mitigation measures (BAMMs and SMMs), including off-site mitigation measures following the guidelines, may be required to reduce the overall air quality impacts of the project to a level of insignificance (TCAPCD, 2009).

Notes:

NO_x = nitrogen oxides.
PM_{10} = Particulate matter consisting of small particles with an aerodynamic diameter less than or equal to a nominal 10 microns (about 1/7 the diameter of a single human hair).
ROG = reactive organic gases.

Source: TCAPCD, 2009.

24.3.3 Impact Assessment Assumptions and Methodology

24.3.3.1 Assumptions

The following assumptions were made regarding Project-related impacts (construction, operation, and maintenance impacts) to air quality:

- Direct Project-related construction, operation, and maintenance activities would occur in the Primary Study Area.
- Direct Project-related operational effects would occur in the Secondary Study Area.
- The only direct Project-related construction activity that would occur in the Secondary Study Area is the installation of an additional pump into an existing bay at the Red Bluff Pumping Plant.
- The only direct Project-related maintenance activity that would occur in the Secondary Study Area is the sediment removal and disposal at the two intake locations (i.e., GCID Canal Intake and Red Bluff Pumping Plant).
- No direct Project-related construction or maintenance activities would occur in the Extended Study Area.
- Direct Project-related operational effects that would occur in the Extended Study Area are related to San Luis Reservoir operation; increased reliability of water supply to agricultural, municipal, and industrial users; and the provision of an alternate Level 4 wildlife refuge water supply. Indirect effects to the operation of certain facilities that are located in the Extended Study Area, and indirect effects to the consequent water deliveries made by those facilities, would occur as a result of implementing the alternatives.

- The existing bank protection located upstream of the proposed Delevan Pipeline Intake/Discharge facilities would continue to be maintained and remain functional.
- No additional channel stabilization, grade control measures, or dredging in the Sacramento River at or upstream of the Delevan Pipeline Intake or Discharge Facilities would be required.

24.3.3.2 Methodology

Air quality impacts from implementation of the alternatives were evaluated in terms of how construction and operations of proposed Project facilities would result in criteria pollutant, toxic air contaminant, and odor emissions. The TCAPCD thresholds were used to evaluate the significance of Project-related air quality impacts because these values have been formally or informally adopted by other air districts in the area (i.e., Glenn County APCD, Butte County AQMD, and Colusa County APCD). Appendix 24A provides the methodology, assumptions, and information used to evaluate the potential air quality impacts associated with construction, and operations and maintenance, of the alternatives. In addition, Appendix 24A includes the emission calculations, emission factors, and summary tables.

Indirectly, the expected changes in operation of power production facilities at Oroville, Shasta, Trinity, and Folsom may affect Project-related emissions. The direct and indirect emissions associated with changes in water operations, power generation, and pumping in the Extended and Secondary study areas were quantified for NO_x as an indicator of criteria pollutant impacts; other pollutants and other indirect effects were evaluated on a qualitative basis.

24.3.4 Topics Eliminated from Further Analytical Consideration

No Project facilities or topics that are included in the significance criteria listed above were eliminated from further consideration in this chapter.

24.3.5 Impacts Associated with the No Project/No Action Alternative

24.3.5.1 Extended and Secondary Study Areas – No Project/No Action Alternative

Construction, Operation, and Maintenance Impacts

Agricultural Water Use, Municipal and Industrial Water Use, Wildlife Refuge Water Use, San Luis Reservoir, Trinity Lake, Lewiston Lake, Trinity River, Klamath River downstream of the Trinity River, Whiskeytown Lake, Spring Creek, Shasta Lake, Keswick Reservoir, Clear Creek, Lake Oroville, Thermalito Complex (Thermalito Diversion Pool, Thermalito Forebay, and Thermalito Afterbay); Feather River; Sutter Bypass; Yolo Bypass; Folsom Lake; Lake Natoma; American River; Sacramento-San Joaquin Delta; Suisun Bay; San Pablo Bay; and San Francisco Bay

Impact Air Qual-1: Conflict with an Applicable Air Quality Plan, Contribute Substantially to an Air Quality Violation, and/or Result in a Cumulatively Considerable Net Increase of Nonattainment Pollutants

The No Project/No Action Alternative assumes implementation of projects and programs being constructed, or those that have gained approval, as of June 2009. The impacts of these projects have already been evaluated on a project-by-project basis, pursuant to CEQA and/or NEPA, and their potential for impacts on air quality has been addressed in those environmental documents. Therefore, **there would not be a substantial adverse effect** on air quality, when compared to Existing Conditions.

Population growth is expected to occur in California throughout the period of Project analysis (i.e., 100 years), and is included in the assumptions for the No Project/No Action Alternative. A larger population could be expected to cause increases in emissions of criteria pollutants. Air quality impacts that would occur as a result of the increased population would be managed in accordance with the regulations that are in effect at the time by various levels of government. Mitigation measures are outlined in local and regional air quality plans prepared by the local air districts and USEPA. Therefore, **there would not be a substantial adverse effect** associated with population growth, when compared to Existing Conditions.

If the No Project/No Action Alternative is implemented, ongoing systemwide net generation and consumption of electricity by the existing CVP and SWP facilities would occur. Energy use by SWP pumping facilities is predicted to increase in the future, resulting in a net decrease in CVP and SWP electrical generation, when compared to Existing Conditions[10]. For a further discussion of the power impacts, refer to Table 31-7 and Section 31.3.5.1 in Chapter 31 Power Production and Energy.

To evaluate the potential indirect air quality impacts of systemwide increases in electricity use and decreases in generation, NO_x emissions were estimated for the predicted systemwide net generation of electricity by CVP, SWP, and other related facilities for Existing Conditions and the No Project/No Action Alternative (Table 24-9). NO_x emissions were estimated as an indicator of potential indirect emissions impacts; the other criteria pollutant emissions associated with electricity generation were not estimated. The expected increased net energy consumption associated with the No Project/No Action Alternative would result in NO_x emissions of up to 210 pounds per day above Existing Conditions. These emission levels have been estimated to represent the maximum potential indirect effects and could potentially be lower, due to multiple sources of uncertainty and the assumptions used to estimate energy consumption. These potential electricity-related impacts would depend on how and where the electricity is generated. Increased energy efficiency and use of electricity generated by renewable energy sources would result in lower levels of emissions. The electrical generating facilities producing the power would be subject to stringent air quality permitting and emission control requirements, and the systemwide incremental increase in emissions would occur over a large geographic area. As a result, electricity-related emissions of criteria pollutants associated with implementation of the No Project/No Action Alternative **would not have a substantial adverse effect** on air quality, when compared to Existing Conditions.

[10] These impacts are attributable to increases in demands associated with water rights and CVP contracts north of the Delta and increases in demands associated with SWP contracts south of the Delta. The result of these changes in demands is increased long-term average pumping at the SWP Banks Pumping Plant and related pump stations throughout the California Aqueduct.

Table 24-9
Indirect NO_x Emissions from CVP, SWP, and Other Related Electricity Use for Existing Conditions and the No Project/No Action Alternative

Alternative	Long-Term CVP and SWP Electricity Net Use (GWh/yr)[a]	Total NO_x Emissions (lb/day)[b]	Systemwide Incremental Increase (Compared to Existing Conditions) NO_x Emissions (lb/day)
Existing Conditions	-51	(59)	Not Applicable
No Project/No Action Alternative	132	152	210

[a]Source for Project Electricity Net Use: Power and Pumping Cost Reporting Metrics-Summary, NODOS ADEIR/S and FS Alternatives, February 8, 2011, as presented in Appendix 31B. Negative values for net electricity use indicate net electricity generation, and emission values in parenthesis indicated a net emissions benefit. Other related energy use includes energy use for Glenn-Colusa Irrigation District Canal pumping facilities.

[b]Source for NO_x Emission Factor: USEPA, 2012b.

Notes:

CVP = Central Valley Project
GWh/yr = gigawatt hours per year
lb/day = pounds per day
NO_x = nitrogen oxides
SWP = State Water Project

Impact Air Qual-2: Expose Sensitive Receptors to Substantial Pollutant Concentrations

Refer to the **Impact Air Qual-1** discussion. That discussion also applies to substantial pollutant concentrations.

Impact Air Qual-3: Create Objectionable Odors Affecting a Substantial Number of People

Refer to the **Impact Air Qual-1** discussion. That discussion also applies to objectionable odors.

24.3.5.2 Primary Study Area – No Project/No Action Alternative

Construction, Operation, and Maintenance Impacts

Impact Air Qual-1: Conflict with an Applicable Air Quality Plan, Contribute Substantially to an Air Quality Violation, and/or Result in a Cumulatively Considerable Net Increase of Nonattainment Pollutants

Refer to the **Impact Air Qual-1** discussion for the Extended and Secondary study areas. In addition, projects included in the No Project/No Action Alternative are not located within the Primary Study Area and therefore, **would not have a substantial adverse effect** on air quality in the Primary Study Area, when compared to Existing Conditions.

Impact Air Qual-2: Expose Sensitive Receptors to Substantial Pollutant Concentrations

Refer to the **Impact Air Qual-1** discussion for the Extended and Secondary study areas. That discussion also applies to substantial pollutant concentrations.

Impact Air Qual-3: Create Objectionable Odors Affecting a Substantial Number of People

Refer to the **Impact Air Qual-1** discussion for the Extended and Secondary study areas. That discussion also applies to objectionable odors.

24.3.6 Impacts Associated with Alternative A

24.3.6.1 Extended Study Area – Alternative A

Construction, Operation, and Maintenance Impacts

Agricultural Water Use, Municipal and Industrial Water Use, Wildlife Refuge Water Use, and San Luis Reservoir

Impact Air Qual-1: Conflict with an Applicable Air Quality Plan, Contribute Substantially to an Air Quality Violation, and/or Result in a Cumulatively Considerable Net Increase of Nonattainment Pollutants

No direct Project-related construction or maintenance activities would occur in the Extended Study Area, so there would be no direct Project-related emissions or impacts. It is not possible to quantify the indirect air quality emissions or impacts associated with more reliable water supplies for agriculture, municipal and industrial use, and reservoirs, or the provision of an alternate source of refuge water supply; however, these impacts would likely be beneficial because these systems would be maintained in a healthier, more productive state. Potential fugitive dust impacts due to continued fluctuating reservoir levels at San Luis Reservoir would be **less than significant**, when compared to Existing Conditions and the No Project/No Action Alternative, because exposure of shorelines would be intermittent, and dust emissions from exposed areas would not be substantial. Therefore, air quality impacts in the Extended Study Area would be **less than significant**, when compared to Existing Conditions and the No Project/No Action Alternative.

Impact Air Qual-2: Expose Sensitive Receptors to Substantial Pollutant Concentrations

Refer to the **Impact Air Qual-1** discussion. That discussion also applies to substantial pollutant concentrations.

Impact Air Qual-3: Create Objectionable Odors Affecting a Substantial Number of People

Refer to the **Impact Air Qual-1** discussion. That discussion also applies to objectionable odors.

24.3.6.2 Secondary Study Area – Alternative A

Construction, Operation, and Maintenance Impacts

Trinity Lake, Lewiston Lake, Trinity River, Klamath River downstream of the Trinity River, Whiskeytown Lake, Spring Creek, Shasta Lake, Keswick Reservoir, Clear Creek, Lake Oroville, Thermalito Complex (Thermalito Diversion Pool, Thermalito Forebay, and Thermalito Afterbay); Feather River; Sutter Bypass; Yolo Bypass; Folsom Lake; Lake Natoma; American River; Sacramento-San Joaquin Delta; Suisun Bay; San Pablo Bay; and San Francisco Bay.

Impact Air Qual-1: Conflict with an Applicable Air Quality Plan, Contribute Substantially to an Air Quality Violation, and/or Result in a Cumulatively Considerable Net Increase of Nonattainment Pollutants

The only Project-related construction that would occur in the Secondary Study Area is the installation of an additional pump into an existing concrete pump bay at the Red Bluff Pumping Plant, located on the Sacramento River. Construction would require limited operation of construction equipment, such as one mobile crane, and would not be expected to involve earthmoving or land disturbance. Air quality impacts from this minimal construction activity would be minor. Therefore, when compared to Existing

Conditions and the No Project/No Action Alternative, the construction-related air quality impacts in the Secondary Study Area would result in a **less-than-significant impact**.

Operation of the additional pump at the Red Bluff Pumping Plant, as part of Alternative A, would not significantly change the air emissions that are currently generated at the plant. The only Project-related maintenance activity that would occur in the Secondary Study area is related to the removal of sediment from the existing GCID Canal and Red Bluff Pumping Plant intakes. The additional pump at the Red Bluff Pumping Plant would not increase the frequency of existing maintenance activities at the pumping plant, and would not require additional personnel. More frequent dredging of the pumping plant forebay may be required, but this dredging and the additional pumping activities would not be expected to result in a substantial increase in air emissions when compared to existing activities. When compared to Existing Conditions and the No Project/No Action Alternative, Alternative A would result in minor increases in emissions from operations and maintenance activities in the Secondary Study Area, resulting in a **less-than-significant impact**.

When compared to Existing Conditions and the No Project/No Action Alternative, potential changes in the locations and types of recreational use due to the expected improved reservoir storage conditions with implementation of Alternative A may result in changes in emissions, but systemwide recreation-related emissions and impacts would be **less than significant**, when compared to Existing Conditions and the No Project/No Action Alternative.

The expected improved reservoir storage conditions would leave less exposed barren land at the reservoir's edges. Therefore, incremental, intermittent dust emissions and related impacts from exposed areas would be **less than significant**, when compared to Existing Conditions and the No Project/No Action Alternative.

Air quality impacts associated with systemwide increases in electrical use and decreases in net electrical generation would depend on how and where the replacement electricity is generated[11]. For a further discussion of the power impacts, refer to Table 31-8 and Section 31.3.6.1 in Chapter 31 Power Production and Energy. The electrical generating facilities producing the power would be subject to stringent air quality permitting and emission control requirements, and the systemwide incremental increase in emissions would occur over a large geographic area. As a result, electricity-related emissions of criteria pollutants would result in a **less-than-significant impact,** when compared to Existing Conditions and the No Project/No Action Alternative.

Impact Air Qual-2: Expose Sensitive Receptors to Substantial Pollutant Concentrations

Refer to the **Impact Air Qual-1** discussion. That discussion also applies to substantial pollutant concentrations.

Impact Air Qual-3: Create Objectionable Odors Affecting a Substantial Number of People

Refer to the **Impact Air Qual-1** discussion. That discussion also applies to objectionable odors.

[11] As a result of the increased storage of Sites Reservoir, CVP and SWP water supply deliveries and exports from the Delta would be increased. There would be increased long-term average pumping at the SWP Banks Pumping Plant and related pump stations throughout the California Aqueduct. There would also be increased generation at system reservoirs and at Sites Reservoir, but the increase in pumping would be larger than the increase in generation, and therefore, the net generation would decrease for the action alternatives.

24.3.6.3 Primary Study Area – Alternative A

Construction, Operation, and Maintenance Impacts

Construction and operation of proposed Project facilities would result in criteria pollutant emissions. Emissions of NO_x, PM_{10}, $PM_{2.5}$, ROG, CO, SO_x, and CO_2[12] would result from combustion of fuels in construction equipment and material transport trucks. Construction of facilities would result in emissions of PM_{10} and $PM_{2.5}$ from fugitive dust, generated primarily during earthmoving activities. Other sources of fugitive dust include vehicle travel on paved and unpaved roads, creation and management of quarries and borrow sites, concrete batch plants, and material handling, storage, and transport. Similar emissions, at lower levels, may result from operations and maintenance of proposed Project facilities.

All Primary Study Area Project Facilities

Impact Air Qual-1: Conflict with an Applicable Air Quality Plan, Contribute Substantially to an ***Air Quality Violation, and/or Result in a Cumulatively Considerable Net Increase of Nonattainment Pollutants***

Alternative A would involve the construction of proposed surface water storage reservoirs, water intakes, conveyance facilities (canals, pipelines, tunnels, and pumping plants), service roads, dams, buildings, recreation facilities, transmission lines, and hydroelectric generation facilities in the Primary Study Area.

Fuel combustion in construction equipment, trucks, and construction worker vehicles would generate criteria air pollutant emissions as exhaust. Emissions of the ozone precursors, ROG and NO_x, from these emissions sources would temporarily contribute to regional atmospheric ozone problems during the proposed construction period. Construction activities would also generate fugitive dust from sources such as unpaved roads, concrete batch plants, grading, and excavation. Fugitive dust emissions refer to emissions of PM_{10} and $PM_{2.5}$. Stationary sources that would be needed to support construction activities, such as rock quarries, asphalt plants, and concrete batch plants, would be subject to local air district permitting programs. These permitting programs would keep emissions from permitted equipment within acceptable limits.

Table 24-10 presents the estimated construction emissions for Alternative A, providing average daily construction emissions by construction year, with comparison to significance thresholds established by TCAPCD (TCAPCD, 2009). Detailed calculation spreadsheets and supporting documentation are provided in Appendix 24A.

Alternative A would involve construction, operations, and maintenance of a 1.27-MAF reservoir, Sites and Golden Gate dams, and seven saddle dams. Construction equipment utilization was assumed to be directly related to volume of materials used for dam construction (Barnes pers. comm., 2011), and fugitive dust emissions would be directly related to the area of disturbance.

When compared to Existing Conditions, estimated construction-related emissions for Alternative A would be **significant**, because they would exceed thresholds of significance for NO_x, PM_{10}, and ROG established by TCAPCD (TCAPCD, 2009).

[12] A discussion of greenhouse gases, such as CO_2, and related CEQA significance criteria and impacts, is presented in Chapter 25 Climate Change and Greenhouse Gas Emissions.

Table 24-10
Estimated Average Daily Emission Rates for Criteria Pollutants by Year for Construction of Alternative A Within the Primary Study Area

Construction Year	Emissions (lbs/day)[a,d]					
	NO_x	PM_{10}	$PM_{2.5}$	ROG	CO	SO_x
2013	**2,171**[b]	**344**	124	**247**	833	3
2014	**4,114**	**750**	247	**467**	1,604	5
2015	**3,639**	**655**	219	**414**	1,420	4
2016	**3,688**	**661**	222	**420**	1,448	4
2017	**1,913**	**419**	125	**216**	775	2
2018	**617**	**209**	55	68	267	1
2019	**617**	**209**	55	68	267	1
2020	**519**	**188**	48	57	215	1
2021	98	21	8	11	52	0
Significance Threshold (lb/day)[c]	137	137	-	137	-	-

[a]The average daily construction emission rates for each criteria pollutant (in lb/day) for each construction year are the sum of the average daily emission rates estimated for each of the proposed Project features that would be constructed in the indicated construction year.

[b]**Bolded** values indicate an exceedance of the Significance Threshold.

[c]Significance Threshold is from TCAPCD Level C: Greater than 137 pounds per day of emissions. If emissions from a project would exceed the Level C thresholds, all feasible mitigation measures, including Suggested Mitigation Measures (SMMs), Best Available Mitigation Measures (BAMMs), and off-site mitigation measures, may be required to reduce the overall air quality impacts of the project to a level of insignificance (TCAPCD, 2009).

[d]Fugitive dust emissions from grading were assumed to include daily watering of disturbed areas to control dust, and vehicles traveling on unpaved roads were assumed to be limited to 15 miles per hour.

Notes:

CO = carbon monoxide.
lb/day = pounds per day.
NO_x = nitrogen oxides.
PM_{10} = Particulate matter consisting of small particles with an aerodynamic diameter less than or equal to a nominal 10 microns (about 1/7 the diameter of a single human hair). Their small size allows them to make their way to the air sacs deep within the lungs, where they may be deposited and result in adverse health effects. PM_{10} emissions also cause visibility reduction.
$PM_{2.5}$ = Includes particles with an aerodynamic diameter less than or equal to a nominal 2.5 microns. This fraction of particulate matter penetrates most deeply into the lungs.
ROG = reactive organic gases.
SO_x = sulfur oxides.

Construction of the Alternative A proposed facilities would result in higher levels of emissions than implementation of the No Project/No Action Alternative in the Primary Study Area. Implementation of Alternative A would result in temporary construction-related increases in pollutant emissions, resulting in a **significant impact** on air quality in the Primary Study Area, when compared to the No Project/No Action Alternative.

Operation and maintenance of Alternative A would include activities that must occur to operate and maintain each proposed facility. These activities and their associated impacts would be long-term and permanent. Operation activities would include those related to the use of roads during operations and maintenance activities, recreation activities, the movement of water (such as Sites Reservoir level fluctuations, or the intake or release of water through the Delevan Pipeline Intake Facilities), and the generation and transmission of electricity.

Emissions associated with operations and maintenance of the Alternative A proposed facilities would depend on the size and type of facility, the number of employees and types of equipment, the increased traffic on the local and regional roadway network (including additional haul trucks and workers), and the

level of operations activities. Emissions similar to those expected during construction, but at lower levels, would likely result from facility operations and maintenance. For example, operational sources of fugitive dust would primarily be maintenance equipment and truck movement over paved and unpaved surfaces. Stationary sources, such as electrical generators, would be subject to permitting requirements to limit emissions. Required mitigation and operating conditions would be reflected in needed permits and approvals for the proposed Project.

Table 24-11 presents the estimated daily emissions for operations and maintenance of the Alternative A proposed facilities, with comparison to significance thresholds established by TCAPCD (TCAPCD, 2009). Detailed calculation spreadsheets and supporting documentation are provided in Appendix 24A.

Table 24-11
Estimated Total Emission Rates in lb/day for Operations and Maintenance of Alternative A Proposed Facilities Within the Primary Study Area

	NO_x	PM_{10}	$PM_{2.5}$	ROG	CO	SO_x
Total Average Daily Emissions (lb/day)	33	7	7	38	1308	0.1
TCAPCD Threshold (lb/day), Level A	< 25	< 25	-	< 25	-	-
Threshold Exceeded?	Yes	No	-	Yes	-	-
TCAPCD Threshold (lb/day), Level B	> 25	> 25	-	> 25	-	-
Threshold Exceeded?	Yes	No	-	Yes	-	-
TCAPCD Threshold (lb/day), Level C	> 137	> 137	-	> 137	-	-
Threshold Exceeded?	No	No	-	No	-	-

Notes:

It was assumed that sedans/pickups would travel at a speed of 15 mph which equates to 3 roundtrips per hour at a distance of 5 miles per roundtrip.

An estimated total of 60 employees would support operations and maintenance work at all facilities.

CO = carbon monoxide.
lb/day = pounds per day.
NO_x = nitrogen oxides.
PM_{10} = Particulate matter consisting of small particles with an aerodynamic diameter less than or equal to a nominal 10 microns (about 1/7 the diameter of a single human hair). Their small size allows them to make their way to the air sacs deep within the lungs, where they may be deposited and result in adverse health effects. PM_{10} emissions also cause visibility reduction.
$PM_{2.5}$ = Includes particles with an aerodynamic diameter less than or equal to a nominal 2.5 microns. This fraction of particulate matter penetrates most deeply into the lungs.
ROG = reactive organic gases.
SO_x = sulfur oxides.
TCAPCD = Tehama County Air Pollution Control District

Implementation of Alternative A would provide increased opportunities for recreational uses in the Primary Study Area. The expected increase in recreational opportunities and recreation visitor days would generate additional vehicle trips to and from the area. These vehicle trips would add to the significant emissions and impacts estimated for operations and maintenance of Alternative A facilities.

Operations of the proposed Sites Reservoir, Holthouse Reservoir, and the TRR could result in significant fluctuations of water levels, leaving exposed barren land at the reservoirs' edges when the water level is lowered. Exposed areas may be sources of fugitive dust, depending on local conditions of temperature, humidity, and wind. Because these dust emissions would be intermittent, they are expected to result in a **less-than-significant impact** on air quality.

Operations of proposed Project facilities would generate electricity, but would also result in additional electricity consumption due to pumping and facility operations. Alternative A would have greater operations-related emissions than Existing Conditions and the No Project/No Action Alternative, because it would result in net energy consumption, and would require additional electricity generation. To evaluate the

potential indirect impacts on air quality, NO_x emissions were estimated for the predicted systemwide net generation and consumption of electricity by CVP, SWP, and proposed Project facilities associated with Alternative A. NO_x emissions were estimated as an indicator of potential indirect emissions impacts; the other criteria pollutant emissions associated with electricity generation were not estimated.

Table 24-12 summarizes the NO_x emissions estimated for each of the action alternatives, when compared to emissions estimated for the net generation and consumption of electricity for Existing Conditions and the No Project/No Action Alternative. Emissions associated with Alternatives B and C are presented in Table 24-12 for the purpose of comparison and are evaluated in their respective discussions. Increased energy consumption associated with Alternative A would result in indirect NO_x emissions of up to 632 pounds per day above Existing Conditions, and up to 422 pounds per day above the No Project/No Action Alternative. These emission levels have been estimated to represent the maximum potential indirect effects, and could potentially be lower, due to multiple sources of uncertainty and the assumptions used to estimate electricity generation. These potential electricity-related impacts may add to emissions and significant air quality impacts in the Primary Study Area, depending on how and where the electricity is generated.

Table 24-12
Indirect NO_X Emissions from Electricity Use for Existing Conditions, the No Project/No Action Alternative, and Alternatives A, B, and C

Scenario	Electricity Long-Term Net Use (GWh/yr)[a]	Total NO_x Emissions (lb/day)[b]	Incremental Increase (Compared to Existing Conditions) NO_x Emissions (lb/day)	Incremental Increase (Compared to No Project/No Action Alternative) NO_x Emissions (lb/day)
Existing Conditions	-51	(59)	Not Applicable	Not Applicable
No Project/No Action Alternative	132	152	210	Not Applicable
Alternative A	499	573	632	422
Alternative B	498	572	631	420
Alternative C	543	624	682	472

[a]Source for Project Electricity Net Use: Power and Pumping Cost Reporting Metrics-Summary, NODOS ADEIR/S and FS Alternatives, February 8, 2011, as presented in Appendix 31B. All values include electricity use associated with CVP and SWP operations. Existing Conditions and No Project/No Action Alternative values include other related energy use for Glenn-Colusa Irrigation District Canal pumping facilities. Alternative A, B, and C values include electricity use associated with operation of the proposed Project facilities.

[b]Source for NO_x Emission Factor: USEPA, 2012b.

Notes:

Negative values for net electricity use indicate net electricity generation, and emission values in parentheses indicate a net emissions benefit.

NO_x = nitrogen oxides
CVP = Central Valley Project
SWP = State Water Project
GWh/yr = gigawatt hours per year
lb/day = pounds per day

When compared to Existing Conditions in the Primary Study Area, emissions and air quality impacts associated with long-term operations and maintenance of Alternative A would result in a **significant impact**. This finding is based on the CEQA guidance, thresholds of significance, and attainment plans for the TCAPCD (TCAPCD, 2009). Additional exceedances of significance thresholds could occur when other operational or maintenance activities occur, e.g., the proposed Holthouse Reservoir would be

dredged to remove sediment periodically during the proposed Project duration, resulting in an additional 705 pounds per day of NO_x for 167 days, during dredging years, and periodic dredging would also occur at the proposed TRR and Delevan Pipeline Intake Facilities, and at the existing T-C Canal and GCID Canal intakes.

When compared to the No Project/No Action Alternative, operations and maintenance of Alternative A would result in higher levels of emissions, and a **significant impact**. For example, increased electricity consumption associated with Alternative A implementation would result in NO_x emissions of up to 422 pounds per day more than the No Project/No Action Alternative, on a systemwide basis. These potential electricity-related emissions would potentially add to emissions and significant air quality impacts in the Primary Study Area, depending on how and where the electricity is generated.

Impact Air Qual-2: Expose Sensitive Receptors to Substantial Pollutant Concentrations

Construction-related activities for large surface water reservoirs and related facilities would require the use of heavy equipment, such as excavators, graders, scrapers, bulldozers, backhoes, and concrete mixing and pumping trucks. Haul trucks would be used to move borrow and/or spoils and other materials. Emissions of CO and toxic air contaminants (TACs) could result from fuel combustion to support site preparation and construction activities required for the proposed Project. TACs that could be generated by the combustion of fuels include benzene, formaldehyde, acrolein, and other products of incomplete combustion. Health impacts from human exposure to localized CO emissions and TACs from construction are dependent on the magnitude of the concentrations that sensitive receptors may be exposed to, the duration of exposure, and the relative toxicities of the individual pollutants.

Due to the rural nature of most of the proposed Project construction activities, CO hot spots are not expected to result from construction-related changes in traffic patterns.

Emissions of airborne naturally occurring asbestos are not expected to result from proposed land disturbance activities. Ultramafic rocks likely to contain naturally occurring asbestos are not found within the Primary Study Area or in the watersheds draining into the Primary Study Area (see Chapter 16 Geology, Minerals, Soils, and Paleontology for more details).

Preparation of the proposed Sites Reservoir Inundation Area for filling would involve demolition of several structures. To avoid adverse Project-related air quality impacts, construction contractors conducting demolition and disposal of asbestos-containing material (ACM) must comply with various regulatory requirements, such as the Asbestos National Emission Standard for Hazardous Air Pollutants (NESHAP) (40 CFR 61, Subpart M).

Diesel PM from diesel-fueled on-road haul trucks and off-road equipment would be the primary TAC of concern for proposed Project construction activities. Because of the variable nature of construction activity, the generation of TAC emissions in most cases would be temporary, especially considering the short amount of time such equipment is typically within an influential distance that would result in the exposure of sensitive receptors to substantial concentrations. In its CEQA Guidelines, the Bay Area Air Quality Management District (BAAQMD) cites studies by ARB that show concentrations of mobile-source diesel PM are typically reduced by 70 percent at a distance of approximately 500 feet from the source. In addition, current models and methodologies for conducting health risk assessments are associated with longer-term exposure periods of nine, 40, and 70 years, which do not correlate well with the temporary and highly variable nature of project construction activities. This results in difficulties with producing accurate estimates of health risk during construction (BAAQMD, 2011).

Most of the proposed construction activities and exhaust emissions from equipment would occur in rural areas, typically more than 1,000 feet from sensitive receptors. Diesel-fueled construction equipment would operate only a limited period of time at any given location, and would be subject to stringent regulatory requirements. When compared to Existing Conditions and the No Project/No Action Alternative, sensitive receptors would not be exposed to substantial pollutant concentrations from Project-related construction equipment exhaust emissions, and the associated impacts would be **less than significant**.

Emission sources similar to those expected during proposed Project construction, but at lower levels, would likely result from operations and maintenance of the proposed Project. Activities associated with operations and maintenance of proposed Project facilities would occur intermittently and generate emissions sporadically over the lifetime of the proposed Project. In addition, particulate matter emissions are anticipated to occur away from sensitive receptors and at levels below the TCAPCD thresholds of significance (Table 24-11). It is assumed that CO and TAC emissions from stationary sources would be subject to air district permitting requirements to limit exposure to sensitive receptors. In addition, mobile sources would be subject to ARB emission standards and Airborne Toxic Control Measures. Therefore, when compared to Existing Conditions, sensitive receptors would not be exposed to substantial pollutant concentrations and the impact would be **less than significant**.

Implementation of Alternative A would result in greater construction- and operations and maintenance-related emissions than the No Project/No Action Alternative in the Primary Study Area. However, these emissions would not be expected to expose sensitive receptors to substantial pollutant concentrations, resulting in **a less-than-significant impact**.

Impact Air Qual-3: Create Objectionable Odors Affecting a Substantial Number of People

Odors may result from construction and operation of the proposed Project, especially if activities involve or would result in anaerobic decomposition of organic materials. Alternative A operations would result in large fluctuations in water surface elevations at the proposed Sites Reservoir. Under very low reservoir elevations, algal growth may contribute to localized odors. The reservoir would be located in a rural area with no permanent residents living near the water's edge. In addition, when the reservoir would be drawn down to a very low level, it is unlikely that many recreationists would visit it, so any odors that would be generated by algal growth would be unlikely to affect a substantial number of people.

Odors may be generated through exhaust emissions from diesel equipment, but the emission sources would not remain in one location for long periods of time, and the emissions would be intermittent and would dissipate from the source rapidly. In addition, the types of land uses that typically result in odor problems include agriculture, wastewater treatment plants, food processing and rendering plants, chemical plants, landfills, composting facilities, and dairies. Alternative A does not include construction or operation of any of these land use activities or any similar land uses.

When compared to Existing Conditions, construction and operation of Alternative A would not generate objectionable odors affecting a substantial number of people and the impact would be **less than significant**.

When compared to the No Project/No Action Alternative, Alternative A would have greater construction-, operations-, and maintenance-related impacts. However, construction, operations, and maintenance activities for Alternative A are not anticipated to create objectionable odors affecting a substantial number of people because of the lack of permanent residents around the reservoir's edge, and because it is

unlikely that many recreationists would visit the reservoir when it is drawn down to a very low level. This would, therefore, result in a **less-than-significant impact**.

24.3.7 Impacts Associated with Alternative B

24.3.7.1 Extended and Secondary Study Areas – Alternative B

Construction, Operation, and Maintenance Impacts

The impacts associated with Alternative B, as they relate to compliance with air quality standards (**Impact Air Qual-1**), substantial pollutant concentrations (**Impact Air Qual-2**), and objectionable odors (**Impact Air Qual-3**), would be the same as those described for Alternative A for the Extended and Secondary study areas.

24.3.7.2 Primary Study Area – Alternative B

Construction, Operation, and Maintenance Impacts

The following proposed Primary Study Area Project facilities are included in both Alternatives A and B. These facilities would require the same construction methods and operation and maintenance activities regardless of alternative, and would, therefore, result in the same construction, operation, and maintenance impacts to air quality:

- Recreation Areas
- Sites Pumping/Generating Plant
- Sites Electrical Switchyard
- Tunnel from Sites Pumping/Generating Plant to Sites Reservoir Inlet/Outlet Structure
- Sites Reservoir Inlet/Outlet Structure
- Field Office Maintenance Yard
- Holthouse Reservoir Complex
- Holthouse Reservoir Electrical Switchyard
- GCID Canal Facilities Modifications
- GCID Canal Connection to the TRR
- TRR
- TRR Pumping/Generating Plant
- TRR Electrical Switchyard
- TRR Pipeline
- TRR Pipeline Road
- Delevan Pipeline
- Delevan Pipeline Electrical Switchyard

Alternative B includes the construction of a proposed 1.81-MAF Sites Reservoir. The increased reservoir size would require a larger footprint for the proposed Sites and Golden Gate dams and necessitate the construction of nine saddle dams. However, similar to that described for Alternative A, there are no sensitive receptors located within one mile of these facilities.

The proposed Alternative B Delevan Transmission Line would differ from Alternative A. There would be no transmission line alignment between the Sacramento River and the PG&E or WAPA transmission line. The transmission line would be approximately three miles long, from the proposed Sites Electrical Switchyard to the PG&E or WAPA transmission line, which would be located west of the proposed TRR.

Similar to that described for Alternative A, there are no sensitive receptors located within 0.5 mile of this construction area.

The proposed Alternative B Road Relocations and South Bridge would differ slightly from those described for Alternative A. The lengths of the saddle dam access roads included in Alternative A would be reduced in Alternative B because the dams would be larger and would be located closer to the main roads. In addition, an extension of an access road would be constructed for Alternative B to provide access from Saddle Dam 3 to Saddle Dams 1 and 2. However, there are no sensitive receptors located within a 0.5-mile radius of these portions of the road relocations.

Alternative B would replace the proposed Delevan Pipeline Intake Facilities with the smaller proposed Delevan Pipeline Discharge Facility. The proposed Delevan Pipeline would be operated as a release-only pipeline, so the associated Delevan Pipeline Discharge Facility would not include a fish screen or any of the facilities needed for the pumping and generating operations that were described for Alternative A.

The boundary of the Project Buffer would be the same for Alternatives A and B, but because the footprints of some of the Project facilities that are surrounded by the Project Buffer would differ between the alternatives, the acreage of land within the Project Buffer would also differ. However, this difference in the size of the area included within the buffer would not change the type of construction, operation, and maintenance activities that were described for Alternative A.

These changes in facility design would result in similar construction-, operation-, and maintenance-related impacts to sensitive receptors from substantial pollutant concentrations **(Impact Air Qual-2)** and objectionable odors **(Impact Air Qual-3)** as described for Alternative A. However, emissions associated with Alternative B would be more than those estimated for Alternative A, due to the proposed Project design features included in Alternative B that would differ from Alternative A (refer to above discussion). The increased emissions are presented and discussed below.

Impact Air Qual-1: Conflict with an Applicable Air Quality Plan, Contribute Substantially to an Air Quality Violation, and/or Result in a Cumulatively Considerable Net Increase of Nonattainment Pollutants

Table 24-13 presents the results for emission calculations for construction of Alternative B, providing average daily construction emissions by construction year, with comparison to significance thresholds established by TCAPCD (TCAPCD, 2009). Detailed calculation spreadsheets and supporting documentation are provided in Appendix 24A. As indicated in Table 24-13, emissions estimated for construction of Alternatives B and C would be the same because there are only minor differences between the two alternatives with regard to overall construction requirements. For example, Alternative B does not include construction of the proposed Delevan Transmission Line from the PG&E or WAPA line to the Sacramento River, and the proposed Alternative C Delevan Pipeline Intake Facilities would be replaced by the smaller proposed Alternative B Delevan Pipeline Discharge Facility. These differences in required construction activities are not expected to result in substantial differences in the estimated construction emissions.

When compared to Existing Conditions in the Primary Study Area, impacts associated with temporary construction-related emissions of criteria air pollutants and precursors for Alternative B would be **significant**. Construction of Alternative B facilities would result in higher levels of emissions than for the No Project/No Action Alternative. These impacts would be temporary and adverse, resulting in a **significant impact**.

When compared to Existing Conditions in the Primary Study Area, emissions and air quality impacts associated with long-term operation and maintenance of Alternative B would result in a **significant impact**. Refer to Tables 24-11 and 24-12, and the discussion for **Impact Air Qual-1** for Alternative A in the Primary Study Area.

When compared to the No Project/No Action Alternative, Alternative B would have increased emissions. Increased electricity consumption associated with Alternative B would result in NO_x emissions of up to 420 pounds per day more than the No Project/No Action Alternative, on a systemwide basis. These electricity-related emissions would potentially add to emissions and significant impacts in the Primary Study Area, depending on how and where the electricity is generated.

Table 24-13
Estimated Average Daily Emission Rates for Criteria Pollutants by Year for Construction of Alternatives B and C

Construction Year	Emissions (lbs/day)[a,d]					
	NO_x	PM_{10}	$PM_{2.5}$	ROG	CO	SO_x
2013	**2,171**[b]	**344**	124	**247**	833	3
2014	**4,487**	**860**	274	**508**	1,749	6
2015	**4,012**	**765**	246	**455**	1,565	5
2016	**4,061**	**770**	250	**460**	1,593	5
2017	**2,286**	**528**	153	**257**	920	3
2018	**990**	**319**	83	109	412	1
2019	**990**	**319**	83	109	412	1
2020	**892**	**298**	76	98	360	1
2021	98	21	8	11	52	0
Significance Threshold (lb/day)[c]	137	137	-	137	-	-

[a]The average daily construction emission rates for each criteria pollutant (in lb/day) for each construction year are the sum of the average daily emission rates estimated for each of the Project features that would be constructed in the indicated construction year.

[b]**Bolded** values indicate an exceedance of the Significance Threshold.

[c]Significance Threshold is from TCAPCD Level C: Greater than 137 pounds per day of emissions. If emissions from a project would exceed the Level C thresholds, all feasible mitigation measures, including Suggested Mitigation Measures (SMMs), Best Available Mitigation Measures (BAMMs), and off-site mitigation measures, may be required to reduce the overall air quality impacts of the project to a level of insignificance (TCAPCD, 2009).

[d]Fugitive dust emissions from grading were assumed to include daily watering of disturbed areas to control dust, and vehicles traveling on unpaved roads were assumed to be limited to 15 miles per hour.

Notes:

CO = carbon monoxide.
lb/day = pounds per day.
NO_x = nitrogen oxides.
PM_{10} = Particulate matter consisting of small particles with an aerodynamic diameter less than or equal to a nominal 10 microns (about 1/7 the diameter of a single human hair). Their small size allows them to make their way to the air sacs deep within the lungs, where they may be deposited and result in adverse health effects. PM_{10} emissions also cause visibility reduction.
$PM_{2.5}$ = Includes particles with an aerodynamic diameter less than or equal to a nominal 2.5 microns. This fraction of particulate matter penetrates most deeply into the lungs.
ROG = reactive organic gases.
SO_x = sulfur oxides.
TCAPCD = Tehama County Air Pollution Control District.

Additional exceedances of significance thresholds and significant impacts could occur when other operational and/or maintenance activities occur, e.g., the proposed Holthouse Reservoir would be dredged to remove sediment at least once during the proposed Project duration, resulting in an additional 705 pounds per day of NO_x for 167 days during dredging years, and periodic dredging would also occur at the proposed TRR and Delevan Pipeline Intake and the existing T-C Canal and GCID Canal intakes.

24.3.8 Impacts Associated with Alternative C

24.3.8.1 Extended and Secondary Study Areas – Alternative C

Construction, Operation, and Maintenance Impacts

The impacts associated with Alternative C, as they relate to compliance with air quality standards (**Impact Air Qual-1**), substantial pollutant concentrations (**Impact Air Qual-2**), and objectionable odors (**Impact Air Qual-3**), would be the same as those described for Alternative A for the Extended and Secondary study areas.

24.3.8.2 Primary Study Area – Alternative C

Construction, Operation, and Maintenance Impacts

The following proposed Primary Study Area Project facilities are included in Alternatives A, B, and C. These facilities would require the same construction methods and operation and maintenance activities regardless of alternative, and would, therefore, result in the same construction, operation, and maintenance impacts to air quality:

- Recreation Areas
- Sites Pumping/Generating Plant
- Sites Electrical Switchyard
- Tunnel from Sites Pumping/Generating Plant to Sites Reservoir Inlet/Outlet Structure
- Sites Reservoir Inlet/Outlet Structure
- Field Office Maintenance Yard
- Holthouse Reservoir Complex
- Holthouse Reservoir Electrical Switchyard
- GCID Canal Facilities Modifications
- GCID Canal Connection to the TRR
- TRR
- TRR Pumping/Generating Plant
- TRR Electrical Switchyard
- TRR Pipeline
- TRR Pipeline Road
- Delevan Pipeline
- Delevan Pipeline Electrical Switchyard

The Alternative C design of the proposed Delevan Transmission Line and Delevan Pipeline Intake Facilities is the same as described for Alternative A. These facilities would require the same construction methods and operation and maintenance activities regardless of alternative, and would, therefore, result in the same construction, operation, and maintenance impacts to air quality as described for Alternative A.

The Alternative C design of the proposed Sites Reservoir Inundation Area and Dams and Road Relocations and South Bridge is the same as described for Alternative B. These facilities would require the same construction methods and operation and maintenance activities regardless of alternative, and would, therefore result in the same construction, operation, and maintenance impacts to transportation air quality as described for Alternative B.

The boundary of the proposed Project Buffer would be the same for Alternatives A, B, and C, but because the footprints of some of the proposed Project facilities that are surrounded by the Project Buffer would differ between the alternatives, the acreage of land within the Project Buffer would also differ. However, this difference in the size of the area included within the buffer would not change the type of construction, operation, and maintenance activities that were described for Alternative A.

Alternative C would, therefore, result in similar construction-, operation-, and maintenance-related impacts to sensitive receptors from substantial pollutant concentrations **(Impact Air Qual-2)** and objectionable odors **(Impact Air Qual-3)** as described for Alternative A. However, emissions associated with Alternative C would differ from those estimated for Alternative A. The differences in emissions are discussed below.

Impact Air Qual-1: Conflict with an Applicable Air Quality Plan, Contribute Substantially to an Air Quality Violation, and/or Result in a Cumulatively Considerable Net Increase of Nonattainment Pollutants

Alternative C would result in a **significant impact** to air quality in the Primary Study Area from proposed Project construction, similar to that described for Alternative A. Refer to **Impact Air Qual-1** for Alternative A in the Primary Study Area. Construction emissions associated with Alternative C would be more than those estimated for Alternative A, due to the proposed Project design features included in Alternative C that would be different than Alternative A (refer to above discussion).

As presented in Table 24-13, emissions estimated for construction of Alternatives B and C would be the same, because there are only minor differences between the two alternatives with regard to construction requirements. For example, Alternative C includes construction of a transmission line from the PG&E or WAPA line to the Sacramento River and a pumping plant at the proposed Delevan Pipeline Intake Facilities, but these activities are not expected to result in substantial differences in construction emissions. Therefore, when compared to Existing Conditions, impacts associated with temporary construction-related emissions of criteria air pollutants or precursors for Alternative C in the Primary Study Area would be the same as those described for Alternative B.

Construction of Alternative C facilities would result in higher levels of emissions than for the No Project/No Action Alternative. These impacts would be the same as those described for Alternative B.

When compared to Existing Conditions in the Primary Study Area, impacts associated with long-term operation and maintenance-related emissions of criteria air pollutants and precursors associated with Alternative C would be similar to the **significant impact** described for Alternative A. Refer to Tables 24-11 and 24-12, and the discussion for **Impact Air Qual-1** for Alternative A in the Primary Study Area.

When compared to the No Project/No Action Alternative, Alternative C would result in increased emissions and significant air quality impacts. Increased electricity consumption associated with Alternative C would result in NO_x emissions of up to 472 pounds per day more than the No Project/No Action Alternative, on a systemwide basis. These electricity-related emissions would potentially add to emissions and significant impacts in the Primary Study Area, depending on how and where the electricity is generated.

24.4 Mitigation Measures

Mitigation measures are provided below and summarized in Table 24-14 for the impacts that have been identified as significant or potentially significant.

Table 24-14
Summary of Mitigation Measures for Potential NODOS Project Impacts to Air Quality

Impact	Associated Project Facility	LOS Before Mitigation	Mitigation Measure	LOS[a] After Mitigation
Impact Air Qual-1: Conflict with an Applicable Air Quality Plan, Contribute Substantially to an Air Quality Violation, and/or Result in a Cumulatively Considerable Net Increase of Nonattainment Pollutants	All Primary Study Area Project Facilities (construction)	Significant	Mitigation Measure Air Qual-1a: Develop a Fugitive Dust Control Plan	Significant and Unavoidable for Emissions of PM_{10}
			Mitigation Measure Air Qual-1b: Implement Measures to Reduce Equipment and Vehicle Exhaust Emissions	Significant and Unavoidable for Emissions of NO_x, PM_{10}, and ROG Less than Significant for Emissions of SO_x, CO, and $PM_{2.5}$
	All Primary Study Area Project Facilities (operation and maintenance)[b]	Significant	Mitigation Measure Air Qual-1a: Develop a Fugitive Dust Control Plan	Less than Significant
			Mitigation Measure Air Qual-1b: Implement Measures to Reduce Equipment and Vehicle Exhaust Emissions	Less than Significant

[a]LOS = Level of Significance

[b]Approaches and mitigation measures to address the electricity-related emissions associated with State Water Project and Central Valley Project operational changes are discussed in Chapter 25 Climate Change and Greenhouse Gas Emissions.

Mitigation Measure Air Qual-1a: Develop a Fugitive Dust Control Plan

The Fugitive Dust Control Plan shall include the following information and measures to reduce fugitive PM_{10} and $PM_{2.5}$ emissions:

- Name(s), address(es), and phone number(s) of person(s) responsible for the preparation, submission, and implementation of the plan.
- Description and location of construction activities.
- Listing of all fugitive dust emissions sources.

Land Clearing/Earth Moving:

- Water shall be applied by means of truck(s), hoses, and/or sprinklers as needed prior to any land clearing or earth movement to minimize dust emission.
- Haul vehicles transporting soil into or out of the property shall be covered.
- Water shall be applied to disturbed areas a minimum of two times per day or more as necessary.

- A publicly visible sign shall be posted with the telephone number and person to contact regarding dust complaints. This person shall respond and take corrective action within 24 hours. The telephone number of the local air district shall also be included and visible on the sign.
- All excavation, grading, and/or earth moving activities shall be suspended when average wind speeds exceed 25 mph.

Visibly Dry Disturbed Soil Surface Areas:

- All visibly dry disturbed soil surface areas of operation shall be treated with a dust palliative agent and/or watered to minimize dust emission.

Paved Road Track-Out:

- Existing roads and streets adjacent to the Project shall be cleaned at least once per day unless conditions warrant a greater frequency.

Visibly Dry Disturbed Unpaved Roads:

- All visibly dry disturbed unpaved road surface areas of operation shall be watered to minimize dust emission.
- Unpaved roads shall be graveled to reduce dust emissions, to the extent feasible.
- Water shall be applied to disturbed areas a minimum of two times per day or more as necessary.
- On-site vehicles shall be limited to a speed of 15 miles per hour on unpaved roads.
- Haul roads shall be sprayed down at the end of the work shift to form a thin crust. This application of water shall be in addition to the minimum rate of application.

Vehicles Entering/Exiting Construction Area:

- Vehicles entering or exiting the construction area shall travel at a speed which minimizes dust emissions.

Employee Vehicles:

- Construction workers shall park in designated parking areas(s) to help reduce dust emissions.

Soil Piles:

- Soil pile surfaces shall be moistened if dust is being emitted from the pile(s). Adequately secured tarps, plastic, or other material may be required to further reduce dust emissions. This includes materials stored in piles for use in the concrete batch plant.

Mitigation Measure Air Qual-1b: Implement Measures to Reduce Equipment and Vehicle Exhaust Emissions

- All construction equipment shall be maintained according to manufacturer's specifications.
- Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to five minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]).

- During all construction activities, diesel-fueled portable equipment with maximum power greater than 25 horsepower shall be registered under the ARB's Statewide Portable Equipment Registration Program.
- All fleets of diesel-fueled off-road vehicles shall comply with the emissions standards pursuant to CCR Title 13, Section 2449. To the extent feasible, operate off-road vehicles with engines certified to the Tier 2 or newer emissions standards.
- All on-road trucks shall be operated in compliance with the emission standards per CCR Title 13, Section 2025. To the extent feasible, operate on-road trucks with engines certified to the 2007 model year or newer heavy-duty diesel engine emissions standards.
- To the extent feasible, electric equipment shall be operated.
- Alternatively fueled construction equipment shall be used, to the extent feasible, such as compressed natural gas (CNG), liquefied natural gas (LNG), propane, or biodiesel.
- Electricity used to power facilities and equipment shall be generated by renewable energy sources with state-of-the-art emissions control systems, to the extent feasible.

Implementation of **Mitigation Measures Air Qual-1a** and **Air Qual-1b** would reduce the level of significance of potential proposed Project impacts to air quality to **less-than-significant** for emissions of SO_x, CO, and $PM_{2.5}$ during Project construction and for all emissions during operation and maintenance.

Implementation of **Mitigation Measures Air Qual-1a** and **Air Qual-1b** would lessen the effects of proposed Project-related NO_x, PM_{10}, and ROG emissions on air quality, but impacts would remain **significant and unavoidable** for emissions of NO_x, PM_{10}, and ROG during Project construction.

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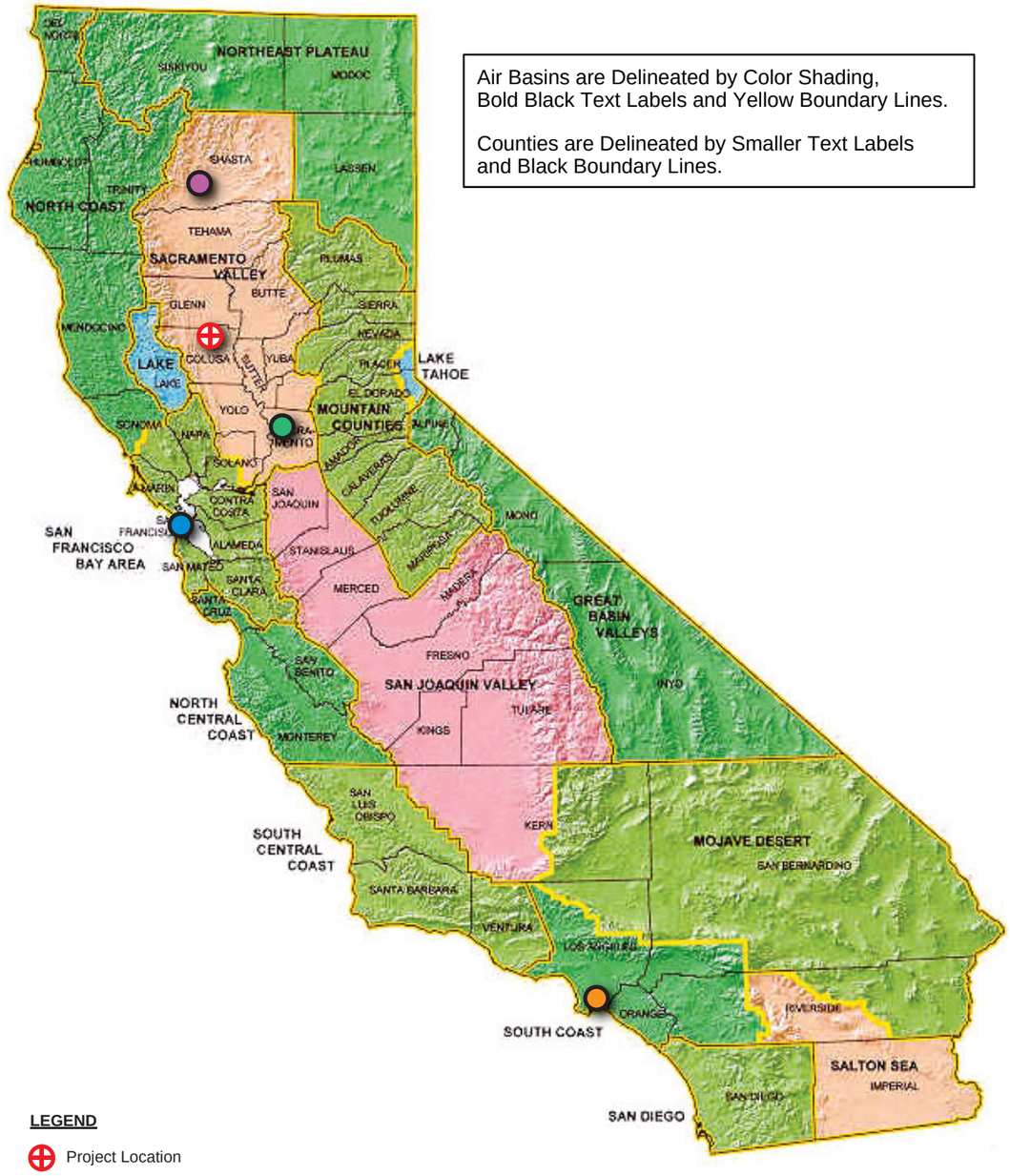
Figure

California Air Basins and Counties

Air Basins are Delineated by Color Shading, Bold Black Text Labels and Yellow Boundary Lines.

Counties are Delineated by Smaller Text Labels and Black Boundary Lines.



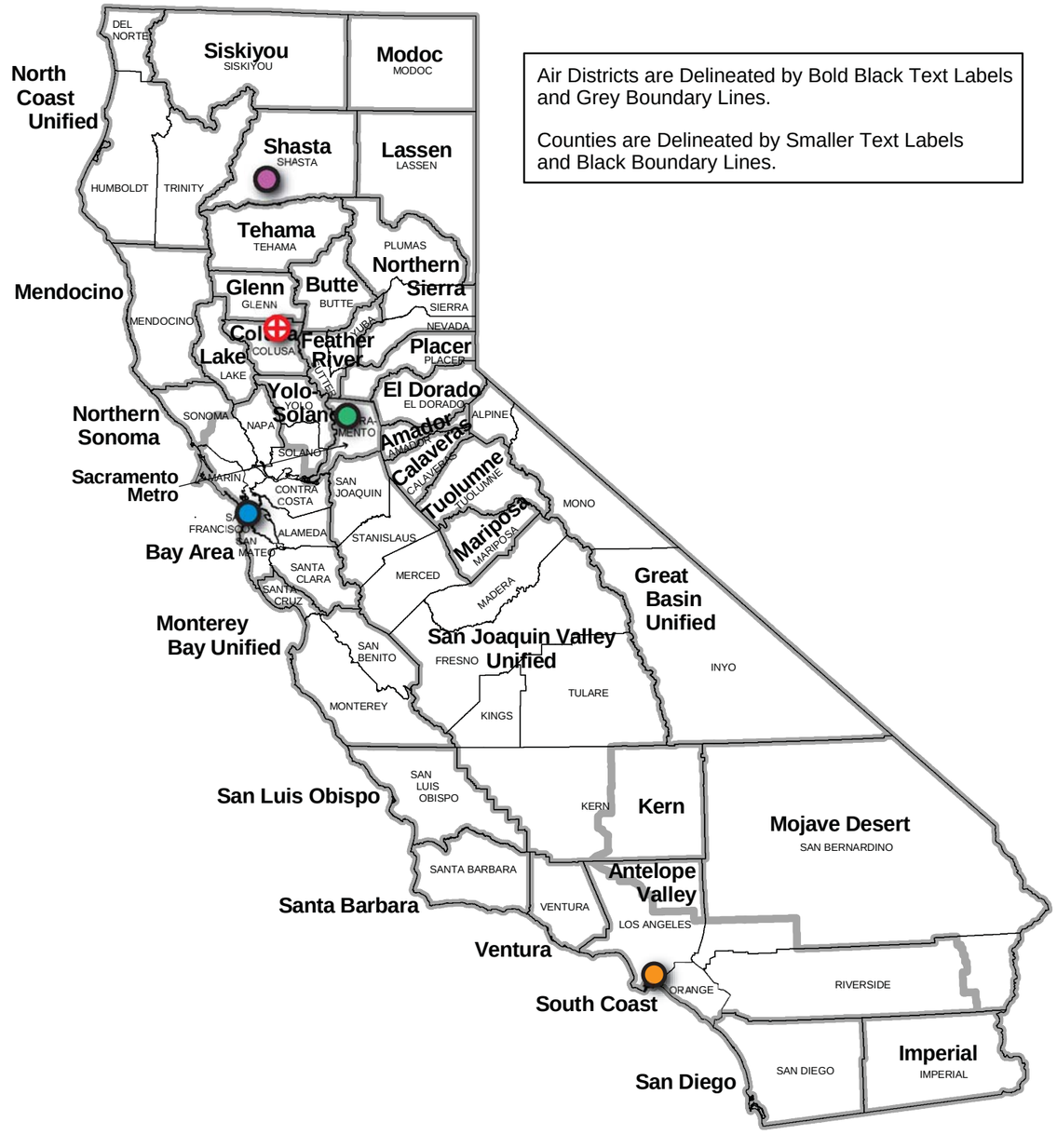
LEGEND

- Project Location
- Redding
- Sacramento
- San Francisco
- Los Angeles

California Air Districts and Counties

Air Districts are Delineated by Bold Black Text Labels and Grey Boundary Lines.

Counties are Delineated by Smaller Text Labels and Black Boundary Lines.



0 50 100 150 200 Miles

N

FIGURE 24-1
Project Location Relative to Air Basins and Air Districts
North-of-the Delta Offstream Storage Project

Source: California Air Resources Board, 2010.

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