3.3.11 Air Quality

The discussion of air quality is broken into four sections. First, the affected environment is discussed in Section 3.3.11.1. Second, the environmental effects of the Project are described in Section 3.3.11.2. Third, proposed conditions for the Project are listed in Section 3.3.11.3. Finally, unavoidable adverse impacts are addressed in Section 3.3.11.4.

Existing, relevant and reasonably available information is sufficient to determine the potential effects of the Project on air quality. FERC's Study Determination, as amended, did not require YCWA to perform any studies related to air quality.

3.3.11.1 Affected Environment

This section describes existing air resources conditions in two general areas: 1) regulatory context; and 2) existing air quality conditions.

3.3.11.1.1 Regulatory Context

The California Air Resources Board (CARB), as part of the California Environmental Protection Agency (Cal EPA), is responsible for protecting public health and the environment from the harmful effects of air pollution. Pollutants associated with air emissions, such as ozone (O_3), particulate matter and nitrogen dioxide (NO_2), are associated with respiratory illness. Carbon monoxide (CO), another air pollutant, can be absorbed through the lungs into the bloodstream and reduce the ability of blood to carry oxygen. Sources of air emissions include commercial facility operations, fugitive dust, vehicles and trucks, aircraft, boats, trains, and natural sources such as biogenic and geogenic hydrocarbons and wildfires.

The topography and meteorology of the western slope of the Sierra Nevada are important factors in the environmental effects of air quality emissions in the vicinity of the Project. Dispersion of high pollutant concentrations in downwind areas is hindered by the mountainous topography. Frequent inversions, in which warm air overlays cool air, trap pollutants close to the ground. In summer, long days, stagnant air, and high temperatures facilitate photochemical production of ozone from precursor air pollutants such as volatile organic compounds (VOC) and nitrogen oxides (NO_x). Regional transport of these precursors from the Sacramento Valley and the San Francisco Bay area result in high ozone concentrations.

To reduce harmful exposure to air pollutants, the federal Clean Air Act (CAA) requires the EPA to set outdoor air quality standards for the nation with the option for states to adopt additional, or more protective standards, if needed. CARB has adopted ambient (outdoor) air quality standards (AAQS) that are more protective than federal standards and has implemented standards for some pollutants not addressed by federal standards. An AAQS establishes the concentration above which the pollutant is known to cause adverse health effects to sensitive groups within the greater population, such as children and the elderly. The goal is for localized effects not to cause or contribute to an exceedance of the standards. Criteria pollutants for which AAQS have been established include ozone, particulate matter, carbon monoxide, nitrogen dioxide, sulfur dioxide and lead. California and federal AAQS for criteria pollutants are presented in Table 3.3.11-1.

Table 3.3.11-1. California and federal ambient air quality standards.

Pollutant	Averaging Time	California Standards[1]		Federal Standards[2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	--	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m^3)		0.075 ppm (147 µg/m^3)		
Respirable Particulate Matter (PM10)	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		--		
Fine Particulate Matter (PM2.5)	24 Hour	No Separate State Standard		35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	15.0 µg/m^3		
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10 mg/m^3)	Non-Dispersive Infrared Photometry	9 ppm (10 mg/m^3)	--	Non-Dispersive Infrared Photometry
	1 Hour	20 ppm (23 mg/m^3)		35 ppm (40 mg/m^3)		
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		--	--	--
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)	Gas Phase Chemiluminescence	0.053 ppm (100 µg/m^3)	Same as Primary Standard	Gas Phase Chemiluminecence
	1 Hour	0.18 ppm (339 µg/m^3)		0.100 ppm[8]		
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	--	Ultraviolet Fluorescence	0.030 ppm (80 µg/m^3)[9]	--	Spectrophotometry (Pararosaniline Method)
	24 Hour	0.04 (105 µg/m^3)		0.14 ppm (365 µg/m^3)	--	
	3 Hour	--		--	0.5 ppm (1,300 µg/m^3)	
	1 Hour	0.25 (665 µg/m^3)		75 ppb[9]	--	--
Lead[10]	30 Day Average	1.5 µg/m^3	Atomic Absorption	---	--	--
	Calendar Quarter	--		1.5 µg/m^3	Same as Primary Standard	High Volume Sampler and Atomic Absorption
	Rolling 3-Month Average[11]	--		0.15 µg/m^3		
Visibility Reducing Particles	8 Hour	Extinction coefficient of 0.23 per kilometer - visibility of 10 miles or more (0.07 - 30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.		No Federal Standards		
Sulfates	24 Hour	25 µg/m^3	Ion Chromatography			

Table 3.3.11-1. (continued)

Pollutant	Averaging Time	California Standards[1]		Federal Standards[2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence	No Federal Standards		
Vinyl Chloride[10]	24 Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

[1] California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, suspended particulate matter—PM10, PM2.5 and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards (AAQS) are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[2] National standards (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 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For PM10, 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 1. For PM2.5, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. National AAQS are listed in the Code of Federal Regulations, Title 40, Part 50.

[3] Concentration expressed first in units in which the standard was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to parts per million (ppm) by volume, or micromoles of pollutant per mole of gas.

[4] Any equivalent procedure that can be shown to the satisfaction of the California Air Resources Board (CARB) to give equivalent results at or near the level of the air quality standard may be used.

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

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

[7] Reference method as described by the federal EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the EPA.

[8] To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm (effective January 22, 2010).

[9] On June 2, 2010, the EPA established a new 1-hour SO_2 standard, effective August 23, 2010, which is based on the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations. The EPA also proposed a new automated Federal Reference Method using ultraviolet technology, but will retain the older pararosaniline methods until the new FRM have adequately permeated State monitoring networks. The EPA also revoked both the existing 24-hour SO_2 standard of 0.14 ppm and the annual primary SO_2 standard of 0.030 ppm, effective August 23, 2010. The secondary SO_2 standard was not revised at this time; however, the secondary standard is undergoing a separate review by the EPA. Note that the new standard is in units of parts per billion (ppb). California standards are in units of ppm. To directly compare the new primary national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

[10] The CARB has identified lead and vinyl chloride as "toxic air contaminants" with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

[11] National lead standard, rolling 3-month average: final rule signed October 15, 2008.

Both the California and federal governments use ambient air monitoring data to classify areas according to their attainment status with respect to criteria pollutants. These designations are used to identify areas with air quality problems and help determine whether Project emissions would be considered significant under NEPA and CEQA assessments. The three basic designation categories are:

- Attainment—ambient air quality is not in violation of the established standard for the specific criteria pollutant.
- Non-attainment—ambient air quality violates the established standard for the specific criteria pollutant.
- Unclassified—there is currently insufficient data for determining attainment or non-attainment.

In addition to the above designations, California includes a sub-category of the non-attainment designation:

- Non-attainment-transitional – given to non-attainment areas that are making progress and nearing attainment

Existing Air Quality

To manage air quality problems, California is divided into 15 air basins, each of which is associated with one or more Air Quality Management Districts. Sierra and Nevada Counties are within the Northern Sierra Air Quality Management District, while Yuba County is within the Feather River Air Quality Management District (Cal EPA 2013). Table 3.3.11-2 shows the current federal and State attainment status for each pollutant in each county.

Table 3.3.11-2. Attainment status for air quality pollutants in Nevada, Sierra and Yuba counties.[1]

Pollutant	State Attainment Status			National Attainment Status		
	Yuba	Sierra	Nevada	Yuba	Sierra	Nevada
Ozone (1 hr)[2]	Non-Attainment	Unclassified	Non-Attainment	--	--	--
Ozone (8 hr)	Non-Attainment	Unclassified	Non-Attainment	Unclassified/ Attainment	Unclassified/ Attainment	Non-Attainment
Carbon Monoxide	Unclassified	Unclassified	Unclassified	Unclassified/ Attainment	Unclassified/ Attainment	Unclassified/ Attainment
Nitrogen Dioxide	Attainment	Attainment	Attainment	Unclassified/ Attainment	Unclassified/ Attainment	Unclassified/ Attainment
Fine Particulate Matter (PM2.5)	Attainment	Unclassified	Unclassified	Non-Attainment	Unclassified/ Attainment	Unclassified/ Attainment
Respirable Particulate Matter (PM10)	Non-Attainment	Non-Attainment	Non-Attainment	Unclassified	Unclassified	Unclassified
Sulfur Dioxide	Attainment	Attainment	Attainment	Unclassified	Unclassified	Unclassified
Lead	Attainment	Attainment	Attainment	Unclassified/ Attainment	Unclassified/ Attainment	Unclassified/ Attainment
Sulfates	Attainment	Attainment	Attainment	No Federal Standards		
Hydrogen Sulfide	Unclassified	Unclassified	Unclassified			
Visibility Reducing Particles	Unclassified	Unclassified	Unclassified			

Sources: Cal EPA 2013; Environmental Protection Agency Green Book 2012.

[1] Each of the counties is in a different air basin. Specifically, Yuba and Nevada counties are in the Sacramento Valley air basin, and Sierra County is in the Mountain Counties air basin. Classifications are considered under both counties and air basins; therefore, the classifications may differ significantly between counties.

[2] The federal 1-hour ozone rule was vacated on June 15, 2005.

3.3.11.2 Environmental Effects

This section includes a description of the anticipated effects of YCWA's proposed Project, which includes YCWA's proposed PM&E measures (Appendix E2) on air quality. The section is divided into the following areas: 1) effects of construction-related activities; 2) effects of continued Project O&M.

YCWA's proposed Project does not include any specific proposed conditions related to air quality.

3.3.11.2.1 Effects of Construction-Related Activities

YCWA's proposed Project includes the construction of several facilities, including New Colgate Powerhouse TDS, the New Bullards Bar Dam Auxiliary Flood Control Outlet, modifications to Our House Diversion Dam and Log Cabin Diversion Dam fish release outlets, modifications to Lohman Ridge Diversion Tunnel Intake and the construction of various recreation facilities. The new facilities and anticipated construction are described in Section 2.2.1.

As described in Section 2.2.1, most of the construction work will be relatively short in duration (e.g., a few months long), have a small footprint (e.g., a few acres), and require a relatively small workforce and equipment. YCWA will consult with appropriate agencies, including local air quality agencies, to obtain all necessary permits and approvals prior to initiating construction for these facilities. Given the limited construction work and acquisition and adherence to the necessary permits, the construction effects are expected to be less than significant.

3.3.11.2.2 Effects of Proposed Project Operations and Maintenance

The proposed Project would have a less-than-significant adverse effect on air quality. The Project is situated within geographic areas that are currently designated as non-attainment for 8-hour ozone and non-attainment for PM_{10}. Operations of the proposed Project would not result in a net increase of any criteria pollutant. Project O&M and the use of recreation facilities will generate some minor amount of air quality emissions, mainly in the form of automobile emissions from recreation facility use, but these are anticipated to be locally minor and spread over the license term.

Greenhouse gas (GHG) emissions associated with development of hydroelectric systems has been a topic of study by the International Hydropower Association since 2006. A Working Group established to initiate such studies published in April 2008 "Scoping Paper Assessment of Greenhouse Gas Status of Freshwater Reservoirs," in which it was observed that reservoirs that were 5 years or less in age emitted higher levels of GHG, principally methane, than reservoirs 10 years and older. Although there is a wide range of variables associated with reservoir conditions, GHG emissions from the older reservoirs were comparable to natural lakes. This observation was validated in a study performed by Pelletier et al. (2009) for the Hydro-Quebec Eastmain 1 Project. A worldwide study performed by Deemer et al. (2016) on CO_2, CH_4 and N_2O emissions rates from reservoirs found that reservoir ecosystem productivity, primarily trophic status and chlorophyll a concentrations, was the largest single predictor for long-term emissions rates. With regard to YCWA's proposed Project, the reservoirs have been in existence for well over 45 years, and reservoir productivity rates are relatively low based on historical water quality observations. Therefore, environmental effects associated with GHG emissions are less than significant.

3.3.11.3 Proposed Measures Recommended by Agencies or Other Relicensing Participants in Comments on DLA That Were Not Adopted by YCWA

None of the comments that were filed on YCWA's DLA included proposed measures or additional studies regarding air quality resources.

3.3.11.4 Unavoidable Adverse Effects

Construction of YCWA's proposed New Bullards Bar Dam New Auxiliary Flood Control Outlet, New Colgate Powerhouse TDS, modifications to Our House Diversion Dam and Log Cabin Diversion Dam fish release outlets, modifications to Lohman Ridge Diversion Tunnel Intake and construction and modification of various recreation facilities may result in short-term, site-specific adverse effects on air quality. However, since YCWA will obtain all necessary agency permits and approvals for the work, and given the remote location of the Facilities, brief period of work and type of construction activity, the effects on air quality are expected to be minor. The use of these facilities will also generate some emissions, mostly through vehicular use, however, they are also anticipated to be quite minor, being spread throughout the license term. YCWA's proposed Project would not create any other short-term or long-term adverse impacts related to air quality.