3.9 Air Quality

This section focuses on potential air quality impacts from implementing the Proposed Project. Section 3.10 of this EIR discusses greenhouse gas emissions. The State Water Board did not receive comments related to air quality during the NOP public scoping process (Appendix A).

3.9.1 Area of Analysis

Criteria air pollutants and toxic air contaminants (TACs) typically have localized air quality effects and relatively short atmospheric lifetimes (approximately one day). For this reason, the Area of Analysis for air quality includes areas within and adjacent to the Proposed Project Limits of Work (Figure 3.9-1), where construction activities would occur, which are located in Siskiyou County, California. As pollutants can travel on air currents away from the place of generation, the Area of Analysis includes Siskiyou County as a whole, along with Klamath County, Oregon where construction activity related to the removal of J.C. Boyle Dam would occur (Figure 3.9-1). Note that the portion of Proposed Project Limits of Work in Oregon is only being considered to the extent that conditions in this area influence air quality in Siskiyou County, California.

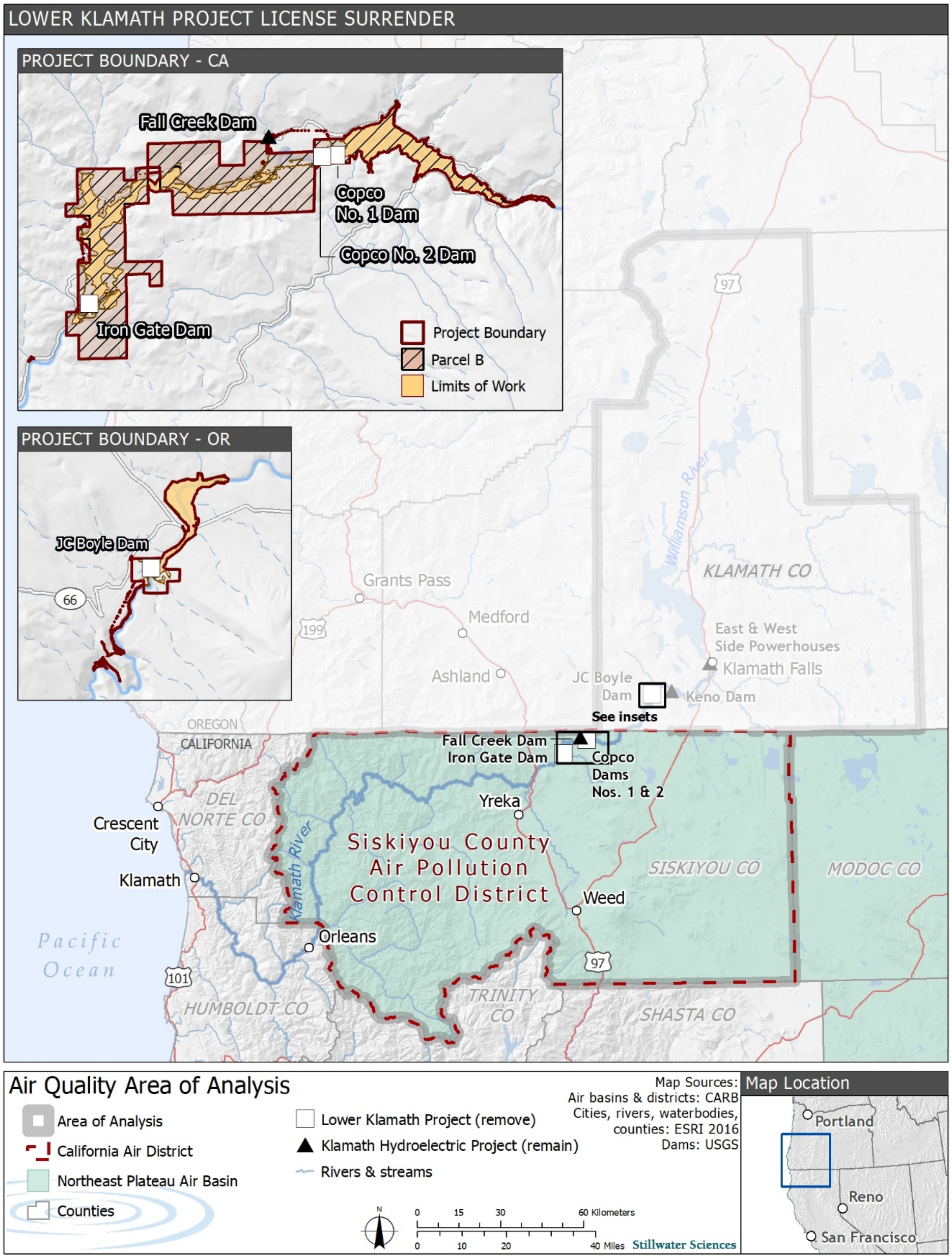

Figure 3.9-1. Area of Analysis for Air Quality.

3.9.2 Environmental Setting

This section provides a description of the environmental setting for air quality in the Area of Analysis, including a brief overview of existing air quality conditions in the portion of the Klamath Basin in California to set the stage for subsequent impact analyses. As Proposed Project construction activities in California would occur in Siskiyou County, this section focuses on the environmental setting in this county.

Ambient concentrations of air pollutant emissions are determined by the amount of emissions released by various sources and the atmosphere's ability to transport and dilute such emissions. In Siskiyou County, the terrain is dominated by volcanic peaks (e.g., Mount Shasta) and forested mountains, with agricultural activities (including rangeland) primarily in areas that are not wooded. Natural factors that affect transport and dilution of air pollutant emissions include terrain, wind, atmospheric stability, and sunlight. Also, air quality is influenced by natural factors, such as topography, meteorology, and climate, in addition to the amount of emissions released by existing air pollutant sources, as discussed separately in this section. The climate of Siskiyou County generally features hot summer days with cool nights and mild winters in the low valleys while the mountainous areas have cool summers and severe winters.

3.9.2.1 Meteorology

The climate in Siskiyou County is characterized by moderately wet winters and dry summers. Approximately 75 percent of the annual total rainfall occurs between November and April. Between June and September, normal rainfall typically is less than one inch per month. Temperatures in Siskiyou County average approximately 60 degrees Fahrenheit (°F) annually, with summer highs in the low 90°F and winter lows in the mid 40°F. Precipitation averages approximately 20 inches per year, although annual precipitation varies markedly from year to year (World Climate 2016). Annual average wind speeds in Siskiyou County are approximately 6.1 miles per hour and predominantly blow from the south. The average wind speed ranges from a low of 5.0 miles per hour in the fall to a high of 7.7 miles per hour in the spring (Western Regional Climate Center 2016).

3.9.2.2 Criteria Air Pollutants

The Clean Air Act requires the U.S. Environmental Protection Agency (USEPA) to set National Ambient Air Quality Standards (NAAQS) for six common air pollutants (also known as "criteria air pollutants") (USEPA 2018). Concentrations of criteria air pollutants are used as indicators of ambient air quality conditions. A brief description of each criteria air pollutant (i.e., source types, health effects, and future trends) is provided below, followed by Section 3.9.2 *Environmental Setting* which describes the air pollutant standards, and subsequent sections that describe whether Siskiyou County complies with the standards.

Ozone

Ozone (O_3) is a photochemical oxidant - a substance whose oxygen combines chemically with another substance in the presence of sunlight. In the lower atmosphere, ozone is the primary component of smog. Ozone is not emitted directly into the air but is formed through complex chemical reactions between certain emissions, known as "precursor emissions," in the presence of sunlight. The precursor emissions for ozone are reactive organic gases (ROG) and nitrogen oxides (NO_X). ROGs are volatile organic compounds that are photochemically reactive. ROG emissions result primarily from incomplete combustion and the evaporation of chemical solvents and fuels. Common sources of ROG emissions include solvents, pesticides, the burning of fuels, and organic wastes. NO_X is a group of gaseous compounds of nitrogen and oxygen that result from the combustion of fuels. Common sources of NOx emissions include emissions from burning of fuel in cars, trucks, buses, power plants, and off-road equipment (USEPA 2018).

Ozone located in the upper atmosphere (stratosphere) shields the earth from harmful ultraviolet radiation emitted by the sun. However, ozone located in the lower atmosphere (troposphere) is a major health and environmental concern. As described below, breathing ozone can trigger a variety of health problems, particularly for children, elderly, and people of all ages who have lung disease such as asthma. Ground level ozone can also have harmful effects on sensitive vegetation and ecosystems, including forests, parks, wildlife refuges, and wilderness areas. Ozone can especially cause damage during the growing season (USEPA 2018).

The adverse health effects associated with exposure to ozone pertain primarily to the respiratory system. Scientific evidence indicates that ambient levels of ozone affect not only sensitive receptors, such as people with asthma and children, but healthy adults as well. Exposure to ambient levels of ozone ranging from 0.10 to 0.40 parts per million (ppm) for one or two hours has been found to substantially alter lung function by increasing respiratory rate and pulmonary resistance, decreasing tidal volume, and impairing respiratory mechanics. Ambient levels of ozone above 0.12 ppm are linked to symptomatic responses that include such symptoms as throat dryness, chest tightness, headache, and nausea. In addition to these adverse health effects, ozone exposure can cause an increase in the permeability of respiratory epithelia (i.e., the thin tissue forming the outer layer of the body's respiratory system); such increased permeability leads to an increase in the respiratory system's responsiveness to challenges and the inhibition of the immune system's ability to defend against infection (Godish 2004).

Meteorology and terrain play a major role in ozone formation in the troposphere (i.e., at ground level). Generally, low wind speeds or stagnant air coupled with warm temperatures and clear skies provide the optimum conditions for formation; therefore, summer generally is the peak ozone season. Peak ozone concentrations often occur far downwind from the precursor emissions due to the time it takes for reactions to complete. Therefore, ozone is a regional pollutant that often affects large areas. In general, ozone concentrations over or near urban and rural areas reflect an interplay of emissions of ozone precursors, transport, meteorology, and atmospheric chemistry.

Carbon Monoxide

Carbon monoxide (CO) is a colorless, odorless, and poisonous gas, produced by incomplete burning of carbon in fuels, primarily from internal-combustion engines used for transportation. In fact, 77 percent of nationwide CO emissions are from transportation. The other 23 percent of emissions are from wood-burning stoves, incinerators, and industrial sources.

CO enters the bloodstream through the lungs by combining with hemoglobin, a component of red blood cells, which normally carries oxygen to the red blood cells. CO combines with hemoglobin much more readily than oxygen does, resulting in a drastic reduction in the amount of oxygen available to the cells. Adverse health effects associated with exposure to CO concentrations include symptoms such as dizziness, headaches, and fatigue. CO exposure is especially harmful to individuals who suffer from cardiovascular and respiratory diseases (USEPA 2018).

The highest CO concentrations generally are associated with the cold, stagnant weather conditions that occur in winter. In contrast to ozone, which tends to be a regional pollutant, CO tends to cause localized problems.

Nitrogen Dioxide

Nitrogen Dioxide (NO_2) is a brownish, highly reactive gas that is present in all urban environments. The major human-made sources of NO_2 are combustion devices, such as boilers, gas turbines, and reciprocating internal-combustion engines (mobile as well as stationary). Combustion devices emit primarily nitric oxide (NO), which reacts with oxygen in the atmosphere to form NO_2 (USEPA 2018). The combined emissions of NO and NO_2 are referred to as NO_X, which is reported as equivalent NO_2. Since NO_2 is formed and depleted by reactions associated with photochemical smog (ozone), the NO_2 concentration in a particular geographical area may not be representative of the local NO_X emission sources.

Inhalation is the most common form of exposure to NO_2, with the principal site of toxicity being the lower respiratory tract. The severity of adverse health effects depends primarily on the concentration of NO_2 inhaled rather than the duration of exposure. An individual may experience a variety of acute symptoms, including coughing, difficulty with breathing, vomiting, headache, and eye irritation, during or shortly after exposure. After approximately 4 to 12 hours of exposure, an individual may experience chemical pneumonitis or pulmonary edema, with breathing abnormalities, cough, cyanosis, chest pain, and rapid heartbeat. Severe, symptomatic NO_2 intoxication after acute exposure has been linked on occasion with prolonged respiratory impairment, including symptoms such as chronic bronchitis and decreased lung function.

Sulfur Dioxide

Sulfur dioxide (SO_2) is produced by stationary sources like coal and oil combustion, steel mills, refineries, and pulp and paper mills. The major adverse health effects associated with SO_2 exposure relate to the upper respiratory tract. SO_2 is a respiratory irritant, with constriction of the bronchioles occurring with inhalation of SO_2 at 5 ppm or more. On contact with the moist mucous membranes, SO_2 produces sulfurous acid, which is a direct irritant. Concentration rather than duration of the exposure is the most important determinant of respiratory effects. Exposure to high SO_2 concentrations may result in edema of the lungs or glottis and respiratory paralysis (USEPA 2018).

Particulate Matter

Particulate matter (PM) is a mixture of solid particles and liquid droplets found in air. PM that is small enough to be inhaled has a diameter of 10 microns or less is referred to as PM_{10}. PM_{10} consists of particulate matter emitted directly into the air, such as fugitive dust, soot, and smoke from mobile and stationary sources, construction operations, fires, natural windblown dust, and can be formed in the atmosphere by condensation or transformation of SO_2 and ROG (USEPA 2018). $PM_{2.5}$ includes a subgroup of finer particles that have a diameter of 2.5 microns or less.

Generally, adverse health effects associated with PM_{10} may result from both short-term and long-term exposure to elevated concentrations, and may include breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular diseases, alterations to the immune system, carcinogenesis, and premature death (USEPA 2018). The adverse health effects associated with PM_{10} depend on the specific composition of the particulate matter. For example, health effects may be associated with adsorption of metals, polycyclic aromatic hydrocarbons, and other toxic substances onto fine particulate matter (referred to as the “piggybacking effect”), or with fine dust particles of silica or asbestos. $PM_{2.5}$ poses an increased health risk when compared to PM_{10} because the particles can deposit deep in the lungs and are more likely to contain substances that are particularly harmful to human health.

Lead

Lead is a metal found naturally in the environment as well as in manufactured products. The major sources of lead emissions historically have been mobile and industrial sources. Due to the phase-out of leaded gasoline, as discussed in detail in this section, metal processing currently is the primary source of lead emissions. The highest levels of lead in the atmosphere generally are found near lead smelters. Other stationary sources include waste incinerators, utilities, and lead-acid battery manufacturers.

Twenty years ago, mobile sources (e.g., motor vehicles using leaded fuel) were the main contributor to ambient lead concentrations in the air. In the early 1970s, the United States Environmental Protection Agency (USEPA) established national regulations to gradually reduce the lead content in gasoline. In 1975, unleaded gasoline was introduced for motor vehicles equipped with catalytic converters. USEPA banned the use of leaded gasoline in highway vehicles in December 1995 (USEPA 2018).

Due to USEPA’s regulatory efforts to remove lead from gasoline, emissions of lead from the transportation sector declined by 95 percent between 1980 and 1999, and levels of lead in the air decreased by 94 percent between 1980 and 1999. Transportation sources, primarily airplanes, now contribute to only 13 percent of lead emissions. A recent National Health and Nutrition Examination Survey reported a 78 percent decrease in the levels of lead in people’s blood between 1976 and 1991. This dramatic decline can be attributed to the move from leaded to unleaded gasoline (USEPA 2018).

Similarly, lead emissions and ambient lead concentrations have decreased dramatically in California over the past 25 years. The phase-out of lead in gasoline began during the 1970s, and subsequent California Air Resources Board (CARB) regulations have eliminated virtually all lead from gasoline now sold in California. All areas of the state currently are designated as attainment for state lead standard (USEPA does not designate areas for the national lead standard). Although the ambient lead standards are no longer violated, lead emissions from stationary sources still pose “hot spot” problems in some areas. Therefore, CARB has identified lead as a toxic air contaminant (TAC).

3.9.2.3 Monitoring-Station Data and Attainment-Area Designations

Concentrations of criteria air pollutants are measured at an ambient air quality monitoring station in Yreka (located at 525 South Foothill Drive), which is the closest monitoring station to the Proposed Project in the Northeast Plateau Air Basin (NPAB). This monitoring station is centrally located in Siskiyou County and is the main station that measures criteria air pollutants in the County. As such, this monitoring station is considered representative of air quality in Siskiyou County. The most recent three years of available information on air quality data is provided in Table 3.9-1. As noted below, carbon monoxide (CO) and nitrogen dioxide (NOx) are not measured at the Yreka monitoring station. Data for CO and NOx in Table 3.9-1 was obtained from the closest monitoring station to Yreka, which is the Eureka-Jacobs monitoring station in Eureka, CA. The most recent data available for CO from the Eureka-Jacobs monitoring station is 2012-2014.

Table 3.9-1. Summary of Annual Ambient Air Quality Data (2014–2016).

	2014	2015	2016
Ozone			
Maximum concentration (1-hour/8-hour average, ppm)	0.082/0.065	0.076/0.066	0.092/0.068
Number of days state standard exceeded (1-hour)	0	0	0
Number of days 8-hour standard exceeded (National/California)	0/0	0/0	0/0
Carbon Monoxide[1]			
Maximum concentration (8-hour, ppm)	0.70	*	*
Number of days state standard exceeded	0	0	0
Number of days national standard exceeded	0	0	0
Nitrogen Dioxide [1]			
Maximum concentration (1-hour, ppb)	26.9	35.9	35.1
Number of days state standard exceeded	0	0	0
Annual average (ppm)	2	3	2
Fine Particulate Matter ($PM_{2.5}$)			
Maximum concentration (ug/m^3) (National/California)	71.9/71.9	51.0/51.0	25.1/25.1
Number of days national standard exceeded (estimated/measured)	*/2	*/2	0.0/0
Annual average (ug/m^3) (National/California)	*/*	*/*	4.9/*
Respirable Particulate Matter (PM_{10})			
Maximum concentration (ug/m^3) (National/California)	90.6/82.9	65.5/59.6	*/*
Number of days state standard exceeded (estimated/measured)	*/3	6.1/1	*/0
Number of days national standard exceeded (estimated/measured)	0.0/0	0.0/0	*/0
Annual average (ug/m^3) (California)	*	12.9	*

Source: CARB 2017

Notes:

ug/m^3 = micrograms per cubic meter

$PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter

PM_{10} = particulate matter less than or equal to 10 microns in diameter

ppm = parts per million

ppb = parts per billion

* Insufficient data available to determine the value.

[1] Carbon monoxide and nitrogen dioxide are not measured at any monitoring station in the NPAB. The data shown in the table were obtained from the Eureka-Jacobs monitoring station in Eureka, California, which is approximately 135 miles southwest of the Proposed Project. The most current data available for carbon monoxide from this monitoring station were for the years 2012–2014.

Both CARB and USEPA use this type of monitoring data to designate areas according to their attainment status for criteria air pollutants. The purpose of these designations is to identify areas with air quality problems, and initiate planning efforts for improvement. The three basic designation categories are "non-attainment," "attainment," and "unclassified." The attainment designation means that an area meets the national or state ambient air quality standards for a given criteria air pollutant. The non-attainment designation means that an area exceeds the national or state ambient air quality standards for a given criteria air pollutant. The unclassified designation is used in an area that cannot be classified on the basis of available information as meeting or not meeting the standards. In addition, the California designations include a subcategory of the non-attainment designation, called "non-attainment-transitional." The non-attainment-transitional designation is given to non-attainment areas that are progressing and nearing attainment.

Table 3.9-2 shows the attainment status of Siskiyou County with respect to national ambient air quality standards (NAAQS) (CARB 2016b) and California ambient air quality standards (CAAQS) (CARB 2016b). As indicated in Table 3.9-2, Siskiyou County is designated as attainment or unclassified for all federal and state ambient air quality standards.

Table 3.9-2. Attainment Status Summary, Siskiyou County.

Criteria Pollutant	Federal Designation	State Designation
Ozone (O_3) (1-hour)	(no federal standard)	Attainment
Ozone (O_3) (8-hour)	Unclassified/Attainment*	Attainment
Nitrogen Dioxide (NO_2)	Unclassified/Attainment*	Attainment
Sulfur Dioxide (SO_2)	Unclassified*	Attainment
Carbon Monoxide (CO)	Unclassified/Attainment*	Unclassified*
Particulates (as PM_{10})	Unclassified*	Attainment
Particulates (as $PM_{2.5}$)	Unclassified/Attainment*	Attainment
Lead (Pb)	Unclassified/Attainment*	Attainment
Sulfates (as SO_4)	(no federal standard)	Attainment
Hydrogen Sulfide (H_2S)	(no federal standard)	Unclassified*
Vinyl Chloride (C_2H_3Cl)	(no federal standard)	n/d
Visibility Reducing Particles	(no federal standard)	Unclassified*

Source: CARB 2015a
Notes:
* At the time of designation, if the available data does not support a designation of attainment or non-attainment, the area is designated as unclassified.
n/d—no data/information available

Appendix N provides a summary of the existing emission sources and monitoring data, detailed emission calculation methodologies, and detailed emission inventories.

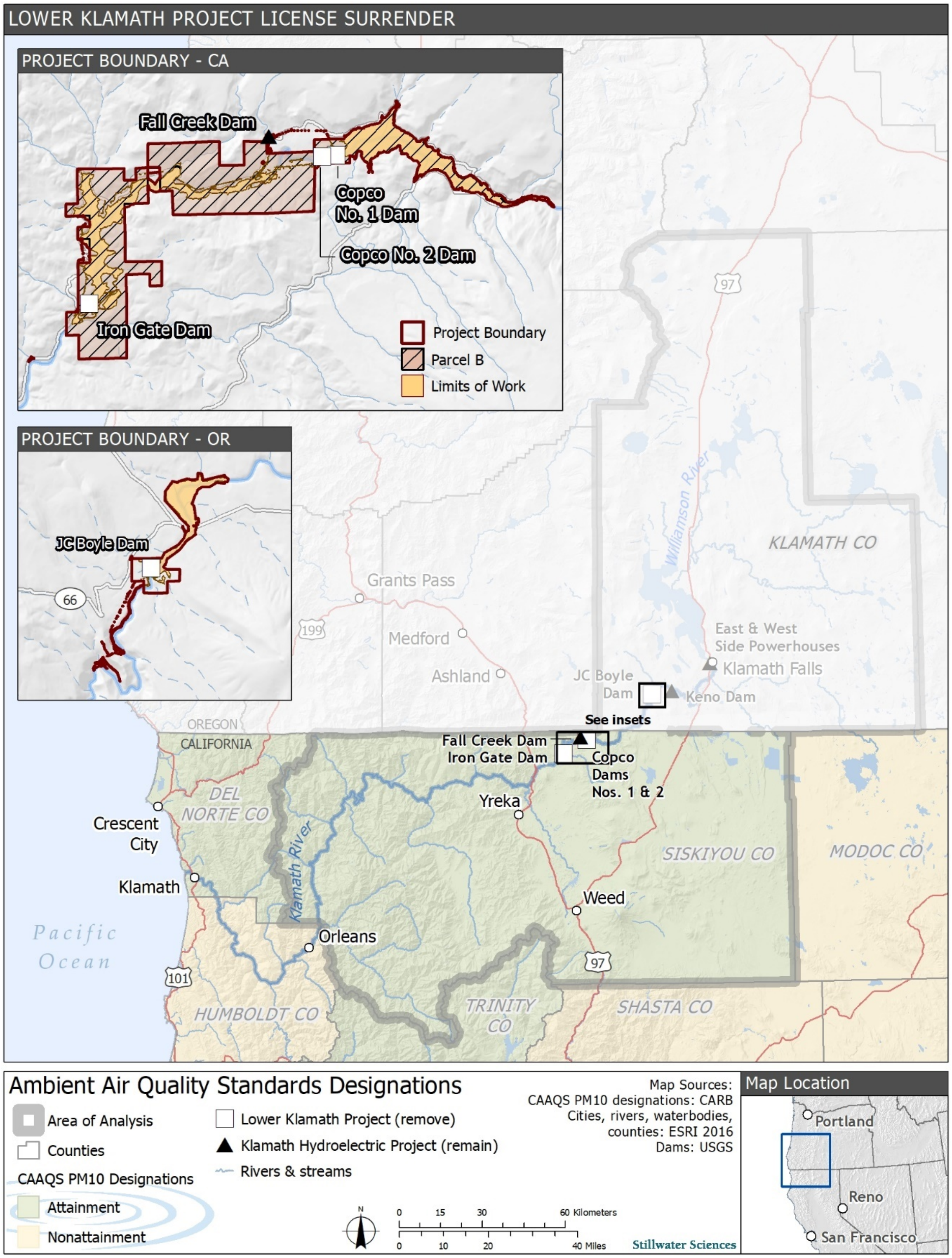

Figure 3.9-2. Particulate Matter (PM_{10}) California Ambient Air Quality Standards (CAAQS) Designations.

3.9.2.4 Air Quality Conditions

Sources of criteria air pollutant emissions in Siskiyou County include stationary, area-wide, and mobile sources. These sources are summarized in Table 3.9-3. According to Siskiyou County's emissions inventory, stationary sources provide a relatively small contribution to total emissions. Area-wide sources, which include emissions spread over a wide area such as consumer products, fire places, road dust, and farming operations, account for approximately 94 percent and 78 percent of the county's total PM_{10} and $PM_{2.5}$ emissions respectively, and 66 percent of total ROG emissions. Mobile sources are the largest contributor to the estimated annual average air pollutant levels of NO_X, accounting for approximately 94 percent of the total emissions. Mobile sources also account for approximately 27 percent of the total ROG emissions for the county.

Table 3.9-3. Summary of 2015 Estimated Emissions Inventory for Siskiyou County.

Source Type/Category	Estimated Annual Average Emissions (Tons per Day)			
	ROG	NO_X	PM_{10}	$PM_{2.5}$
Stationary Sources				
Fuel Combustion	0.09	0.33	0.25	0.24
Waste Disposal	0.00	0.00	0.00	0.00
Cleaning and Surface Coating	0.19	-	-	-
Petroleum Production and Marketing	0.40	-	-	-
Industrial Processes	0.14	-	0.35	0.15
Subtotal (Stationary Sources)	**0.82**	**0.33**	**0.61**	**0.39**
Area wide Sources				
Solvent Evaporation	4.63	-	-	-
Miscellaneous Processes	3.89	0.70	17.05	4.80
Subtotal (Area-wide Sources)	**8.52**	**0.70**	**17.05**	**4.80**
Mobile Sources				
On-Road Motor Vehicles	1.74	4.96	0.24	0.13
Other Mobile Sources	0.90	2.40	0.11	0.10
Subtotal (Mobile Sources)	**2.64**	**7.36**	**0.36**	**0.23**
Grand Total for Siskiyou County	**11.98**	**8.39**	**18.01**	**5.42**

Source: CARB 2015b
Notes: "-" = less than 0.1 ton per day
Totals shown in this table are rounded, and therefore may not appear to add exactly.

3.9.2.5 Local Emission Sources

Land uses surrounding the Limits of Work for the Proposed Project include mainly open space and recreational land. Sources of criteria air pollutants are primarily area-wide and mobile sources. Mobile sources include road motor vehicles, such as trucks and passenger vehicles. Area-wide sources include road dust, farming operations, and fire places.

3.9.2.6 Air Quality—Toxic Air Contaminants

Toxic Air Contaminants (TACs) are air pollutants that may cause or contribute to an increase in mortality or serious illness or pose a hazard to human health. TACs usually are present in small quantities in the ambient air. However, in some cases, their high toxicity or health risk may pose a threat to public health even at low concentrations. Of the TACs for which data are available in California, diesel PM, benzene, 1,3-butadiene, acetaldehyde, carbon tetrachloride, hexavalent chromium, para-dichlorobenzene, formaldehyde, methylene chloride, and perchloroethylene pose the greatest ambient risks.

According to CARB, the majority of the estimated health risk from TACs can be attributed to relatively few compounds, the most important being particulate matter from diesel-fueled engines (diesel PM) (CARB 2013). Diesel PM differs from other TACs in that it is not a single substance but rather a complex mixture of hundreds of substances. Although diesel PM is emitted by diesel-fueled, internal combustion engines, the composition of the emissions varies depending on engine type, operating conditions, fuel composition, lubricating oil, and whether an emission control system is present. Other sources of particulate matter emissions are discussed in Section 3.9.2.2 *Criteria Air Pollutants*.

Statewide, diesel PM emissions account for approximately two percent of the annual average for on-road emissions, while other diesel PM emissions from off-road mobile sources (e.g., construction and agricultural equipment) account for an additional three percent (CARB 2013). Statewide diesel PM emissions decreased approximately 37 percent from year 2000 to 2010, primarily from implementation of more stringent federal emission standards and cleaner burning diesel fuel (CARB 2013). CARB anticipates that diesel PM emissions from on-road and other mobile sources (e.g., construction and agricultural equipment) will continue to decrease into 2035. This decrease would also be attributed to more stringent emissions standards and the introduction of cleaner burning diesel fuel.

3.9.2.7 Sensitive Land Uses

As noted above, high concentrations of criteria air pollutants and toxic air contaminants can result in adverse health effects to humans. Some population groups are considered more sensitive to air pollution and odors than others; in particular, children, elderly, and acutely ill and chronically ill persons, especially those with cardio-respiratory diseases, such as asthma and bronchitis. Sensitive land uses are facilities that generally house more sensitive people (e.g., schools, hospitals, nursing homes, residences, etc.).

The areas surrounding Iron Gate Dam, Copco No. 1 Dam, and Copco No. 2 Dam are sparsely populated with few sensitive land uses. The nearest sensitive land uses are recreational facilities, located along the Copco No. 1 Reservoir and Iron Gate Reservoir, along with hiking trails around the Fall Creek development (see Section 3.20 *Recreation* for more details). The next closest sensitive land uses include scattered residences that are located along the Klamath River. The closest homes to construction sites are located over 2,000 feet from Copco No. 1 Dam, over 3,500 feet from Copco No. 2 Dam, and over 4,000 feet from Iron Gate Dam. There are also several modular homes located at Copco Village that are currently occupied by PacifiCorp staff. These homes are located within the Limits of Work and range from 850 feet to 2,200 feet west of the Copco No. 2 Powerhouse (Figure 2.7-2). Prior to the beginning of dam deconstruction activities, these homes would be vacated. The nearest licensed daycare providers and hospitals are located in Yreka, approximately 15 miles southwest of Iron Gate Dam. The nearest schools are more than 5 miles from Iron Gate Dam (Bogus Elementary is approximately 5.3 miles; Willow Creek Elementary School is approximately 5.5 miles; Hornbrook Elementary School is more than 6 miles).

3.9.2.8 Characteristics of Odors

Odors generally are regarded as a nuisance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from psychological (e.g., anger or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, or headache).

The ability to detect odors varies considerably among the population and the odor interpretation is subjective. Some individuals have the ability to smell small quantities of specific substances. Others may not have the same sensitivity but may have sensitivities to odors of other substances. In addition, people may have different reactions to the same odor. An odor that is offensive to one person (e.g., from a fast food restaurant) may be perfectly acceptable to another. Unfamiliar odors are detected more easily than familiar odors and are more likely to be offensive.

Quality and intensity are two properties present in any odor. The quality of an odor indicates the nature of the smell experience. For instance, if a person describes an odor as flowery or sweet, then the person is describing the quality of the odor. Intensity refers to the strength of the odor. Odor intensity depends on the odorant concentration in the air. When an odorous sample is progressively diluted, the odorant concentration decreases. As this occurs, the intensity of the odor weakens and eventually becomes so low that detection or recognition of the odor is difficult. At some point during dilution, the concentration of the odorant reaches a detection threshold. An odorant concentration below the detection threshold means that the concentration in the air is not detectable by the average person (Siskiyou County 2017).

Odors currently present on a periodic basis in areas within and adjacent to the Proposed Project Limits of Work are generated from livestock, agricultural crop production, wood burning, wildfires, on-site wastewater treatment systems, and algal blooms in Iron Gate Reservoir and Copco No. 1 Reservoir.

3.9.3 Significance Criteria

Criteria for determining significant impacts on air quality are based upon Appendix G the CEQA Guidelines (California Code of Regulations title 14, section 15000 et seq.) and best professional judgement. Effects on air quality are considered significant if the Proposed Project would result in one or more of the following conditions or situations:

1. Conflict with or obstruct implementation of the California Regional Haze Plan.
2. Exceed the Siskiyou County Air Pollution Control District emissions thresholds in Rule 6.1 (Construction Permit Standards for Criteria Air Pollutants).
3. Result in a cumulatively considerable net increase of any criteria pollutant for which the Siskiyou County Air Pollution Control District is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).
4. Expose sensitive receptors to substantial toxic air contaminant concentrations during project construction.
5. Create objectionable odors affecting a substantial number of people during project construction.

For areas that are designated as non-attainment for criteria air pollutants, some of the air districts in California have developed air quality plans that contain measures designed to reduce the sources of these air pollutants. As noted in Table 3.9-2 (Attainment Status Summary, Siskiyou County), Siskiyou County is designated as attainment or unclassified for all federal and state ambient air quality standards. As such, the Siskiyou County Air Pollution Control District has not developed any air quality plans relevant to the Proposed Project. As noted above, the construction emissions in Oregon are only being considered to the extent that these emissions would influence air quality in Siskiyou County, California. As such, consistency with air quality plans relevant to Klamath County, Oregon are not considered in this section.

To protect visibility in Class 1 federal lands (e.g., national parks and scenic areas), the USEPA adopted the Regional Haze Rule in 1999. The Rule lays out specific requirements to ensure improvements in the anthropogenic components of visibility at 156 of the largest national parks and wilderness areas across the United States. The vast majority of these areas are in the West (118), with 29 in California, including such national treasures as Yosemite and Sequoia National Parks. Good visibility is essential to the enjoyment of national parks and scenic areas. Across the United States, regional haze has decreased the visual range in these pristine areas from 140 miles to 35–90 miles in the West, and from 90 miles to 15–25 miles in the East. This haze is composed of small particles that absorb and scatter light, affecting the clarity and color of what humans see in a vista. The pollutants (also called *haze species*) that create haze are measurable as sulfates, nitrates, organic carbon, elemental carbon, fine soil, sea salt, and coarse mass. Anthropogenic sources of haze include industry, motor vehicles, agricultural and forestry burning, and dust from soils disturbed by human activities. Pollutants from these sources, in concentrations much lower than those which affect public health, can impair visibility anywhere.

To comply with the Regional Haze Rule, CARB developed a Regional Haze Plan (CARB 2009) which sets out a long-term path towards attaining improved visibility in national parks and other scenic areas, with the goal of achieving visibility which reflects natural conditions by year 2064. An air quality impact would be significant if the construction emissions from the Proposed Project would substantially conflict with or obstruct implementation of the Regional Haze Plan.

Siskiyou County is in attainment or unclassified for all criteria air pollutants and the Siskiyou County Air Pollution Control District (SCAPCD) has not adopted thresholds of significance for conducting an air quality analysis under CEQA. However, the SCAPCD Rule 6.1 (Construction Permit Standards for Criteria Pollutants) contains thresholds for operational emissions from new stationary sources (CARB 2016a). Criteria air pollutants from the operation of stationary sources are considered significant if they exceed the following thresholds.

- 250 pounds per day for NO_x, volatile organic compounds (VOC), PM_{10}, $PM_{2.5}$, sulfur oxides (SO_x)
- 2,500 pounds per day for CO

Since the project proposes construction activity related to the decommissioning of the Lower Klamath Project facilities that would be completed at the end of 2021, it does not include long-term operational emissions. Unlike operational emissions, construction emissions do not occur continuously over the lifetime of a project. Rather, construction emissions are temporary emissions that are spread out over the construction period. Therefore, the application of the SCAPCD stationary source operational emissions significance threshold for construction emissions from the Proposed Project is conservative because these emissions are limited in duration. As such, an air quality standard would be violated, and a significant air quality impact would result, if the construction emissions from the Proposed Project exceed the thresholds in SCAPCD Rule 6.1.

An air quality impact would be significant if project construction would expose sensitive receptors to substantial pollutant concentrations. As noted above, population groups including children, elderly, and acutely ill and chronically ill persons, are considered more sensitive to air pollution than others. Sensitive land uses are facilities that generally house more sensitive people (e.g., schools, hospitals, nursing homes, residences, etc.). Sensitive receptors within a quarter-mile of construction activities would be at the greatest risk for exposure to fugitive dust and heavy equipment emission diesel exhaust during construction. According to the USEPA, the majority of fugitive dust generally settles out of the atmosphere within 300 feet of the source, with larger particles traveling less distance and smaller particles traveling a longer distance (USEPA 1995). According to the CARB, concentrations of mobile-source diesel particulate matter emissions are typically reduced by 70 percent at a distance of approximately 500 feet (CARB 2005).

There are several sources of odors that could result from the Proposed Project including odors from exposed sediments and odors from construction equipment emissions. These potential sources of odors are discussed below along with a determination of whether substantial numbers of people could be impacted by these sources of odors.

3.9.4 Impact Analysis Approach

Within the Area of Analysis, potential air quality impacts due to construction activities related to the removal of the Lower Klamath Project facilities were quantitatively assessed for Siskiyou County, California and Klamath County, Oregon. The quantitative assessment focused on these counties because that is where direct air quality impacts from construction activity would occur. Construction emissions estimates were developed for dam and powerhouse deconstruction, restoration activities, the relocation and demolition of recreation facilities, and the Yreka supply pipeline relocation. As noted above, the construction emissions in Oregon are only being considered to the extent that these emissions would influence air quality in Siskiyou County, California.

No changes in operational sources are part of the Proposed Project; therefore, this analysis considers only construction-related air quality impacts. Operational emissions for the reduced operation of Iron Gate Fish Hatchery combined with the re-instated operation of Fall Creek Hatchery were assumed to be the same as existing operation conditions at Iron Gate Hatchery for eight years following dam removal. This is due to the fact that the existing functions at the Iron Gate Hatchery that would be eliminated as part of dam removal activities, would be replaced by the reopening and operation of the Fall Creek Hatchery and by making improvements to the Iron Gate Hatchery (Section 2.7.6 *Hatchery Operations*).

The construction emissions estimates used for this EIR (Appendix N) were developed in 2011 as part of the 2012 KHSA EIS/EIR analysis. Although there have since been modifications to the Proposed Project schedule (Table 2.7-1), the 2011 emissions modeling is still relevant as the construction-related activities and their associated emissions for the Proposed Project are materially similar to those modeled in 2011. Minor changes in proposed construction activities between the 2012 KHSA EIS/EIR analysis and the Proposed Project are primarily due to the timing associated with removing each dam (Table 2.7.1). The exceptions to this are discussed below. The Proposed Project and the data modeled as part of the 2012 KHSA EIS/EIR are compared to the thresholds noted in Section 3.9.3 *Significance Criteria* and analyzed in Section 3.9.5 *[Air Quality] Potential Impacts and Mitigation*.

As noted in Appendix N, the estimates of earthen material waste that would require on-site disposal has decreased by approximately 80,000 cubic yards under the current project proposal (Appendix B: *Definite Plan*). As such, there is the potential to generate fewer equipment engine exhaust, haul truck engine exhaust, and fugitive dust emissions during the excavation and on-site disposal of earthen materials from the dams. However, the estimates of building waste that would require off-site disposal has increased by approximately 2,600 cubic yards under the current project proposal (Appendix B: *Definite Plan*). As such, there is the potential to generate greater equipment engine exhaust, haul truck engine exhaust, and fugitive dust emissions during the demolition and off-site disposal of building waste.

The decrease in emissions from the excavation and hauling of earthen material waste would partially off-set the increase in emissions from the demolition and hauling of building waste. However, the building waste would require disposal at off-site locations that range from 22 to 28 miles (44 to 56 miles round-trip) from the dams. The earthen material waste would be disposed of at on-site locations that range from 0.25 to 4 miles (0.5 to 8 miles round-trip) from the dams. As such, it is anticipated that the emissions from dam removal activities under the current proposal (Appendix B: *Definite Plan*) would be greater than the emissions estimates calculated for the 2012 KHSA EIS/EIR. This increase would primarily be due to haul truck engine exhaust because of the hauling distance required for the off-site disposal of building waste. This issue is addressed further under Potential Impact 3.9-2.

Quantification of Criteria Air Pollutants

This EIR's air quality analysis calculated estimates of emissions for construction activities related to dam demolition, including heavy equipment use, hauling of demolition debris to landfills, and worker transportation. Appendix N describes the methodology used to develop the emissions inventories related to construction activities. The emissions estimates are derived from the following emissions models and spreadsheet calculations:

- CARB Urban Emissions model, Version 9.2.4 (fugitive dust calculations from construction equipment, cut/fill activities, and building demolition);
- CARB Emissions Factor (EMFAC) 2007 model (on-road vehicle emissions factor model for California);
- USEPA MOBILE6.2[139] (on-road vehicle emissions factor model for Oregon), as applicable;
- CARB OFFROAD2007 (off-road vehicle emissions factor model for California);
- USEPA NONROAD2008a (off-road vehicle emissions factor model for Oregon), as applicable;
- Midwest Research Institute (1996), Improvement of Specific Emission Factors (paved road dust emissions);
- Compilation of Air Pollutant Emission Factors (AP-42) (USEPA 2006).

A combination of techniques was used to estimate emissions from the restoration activities. Emissions from landing and takeoff operations associated with aerial seed application were estimated using the Federal Aviation Administration's Emissions and Dispersion Modeling System. Emissions from hydroseeding barges were estimated using the following sources:

- Analysis of Commercial Marine Vessels Emissions and Fuel Consumption Data (USEPA 2000);
- AP-42, Chapter 3.3: Gasoline and Diesel Industrial Emissions (USEPA 1996);
- Title 17 California Code of Regulations, Section 93115.7: Air Toxic Control Measure for Stationary Compression Ignition Engines—Stationary Prime Diesel-Fueled Compression Ignition Engine (>50 bhp) Emission Standards;
- Title 13 California Code of Regulations, Section 2423: Exhaust Emission Standards and Test Procedures—Off-Road Compression-Ignition Engine.

Emissions from ground support equipment were estimated using the emission factors for off-road engines identified above and EMFAC for on-road motor vehicle emissions.

[139] Although the USEPA recently developed the Motor Vehicle Emission Simulator (MOVES) to replace MOBILE6.2, MOVES has only been approved for use in SIPs and Transportation Conformity (75 FR 9411) (USEPA 2010). As it has not yet been approved for project-level analyses, MOBILE6.2 was used to estimate emissions from on-road vehicles in Oregon.

The California Emissions Estimator Model (CalEEMod), Version 2011.1.1, was used to estimate exhaust emissions that would occur from grading activities associated with restoring parking lots associated with recreational facilities proposed for removal and restoration. The California Emissions Estimator Model makes general assumptions about the quantity and types of construction equipment needed to grade a site based on its size (acreage).

The Sacramento Metropolitan Air Quality Management District's Road Construction Emissions Model, Version 6.3.2 (2009), was used to estimate exhaust emission factors associated with relocation of the Yreka water supply pipeline. The Siskiyou County Air Pollution Control District does not have a comparable model to estimate emissions from linear projects like the proposed pipeline relocation action.

Appendix N contains an estimate of "uncontrolled emissions" and an estimate of emissions after implementation of mitigation measures that were proposed as part of the analysis in the 2012 KHSA EIS/EIR. These included Mitigation Measures Air Quality (AQ)-1 (Off-road construction equipment), AQ-2 (On-road construction equipment), AQ-3 (trucks used to transport materials), and AQ-4 (Dust control measures). Mitigation Measures AQ-1 through AQ-3 required off-road construction equipment and on-road construction equipment and trucks to be equipped with engines that meet certain model year emissions standards. Mitigation Measure AQ-4 required dust control measures to minimize fugitive dust emissions during construction activity. With the implementation of these mitigation measures, the 2012 KHSA EIS/EIR determined construction emissions from the Proposed Project would still result in significant and unavoidable impacts from NO_x and PM_{10}.

The current proposal for the Proposed Project lacks sufficient detail concerning construction activities and it is too speculative to determine whether the mitigation measures proposed in the 2012 KHSA EIS/EIR are feasible and enforceable. As such, the analysis in this section does not include mitigation to minimize impacts from construction emissions generated by the Proposed Project activities. Since similar minimization measures may be implemented during project construction, it is assumed that the emissions generated by the Proposed Project would fall somewhere in the range between the uncontrolled and mitigated emissions estimates contained in Appendix N.

3.9.5 Potential Impacts and Mitigation

Potential Impact 3.9-1 Conflict with or obstruct implementation of the California Regional Haze Plan.

As noted in Table 3.9-2 (Attainment Status Summary, Siskiyou County), Siskiyou County is designated as attainment or unclassified for all federal and state ambient air quality standards. As such, the Siskiyou County Air Pollution Control District has not developed any air quality plans relevant to the Proposed Project. As noted above, the construction emissions in Oregon are only being considered to the extent that these emissions would influence air quality in Siskiyou County, California. As such, consistency with air quality plans relevant to Klamath County, Oregon are not considered in this section.

In 1999, the USEPA adopted the Regional Haze Rule, which requires states to establish a series of interim goals to ensure continued progress towards improving visibility in Class 1 federal lands (e.g., national parks and other scenic areas). To comply with the

Regional Haze Rule, CARB developed a Regional Haze Plan (CARB 2009), which sets out a long-term path towards attaining improved visibility in Class 1 federal lands, with the goal of achieving visibility which reflects natural conditions by year 2064. The closest Class 1 areas near the Proposed Project include the Marble Mountain Wilderness and Lava Beds National Monument. Sources of haze in this area of northern California include, but are not limited to, rural land uses, traffic on Interstate 5, railroad freight traffic, wildfires, and natural biogenic emissions from plants (CARB 2009).

Since the Proposed Project involves construction activity related to the decommissioning of the Lower Klamath Project facilities that would be completed at the end of 2021, and the Proposed Project would not have long-term operational emissions, the potential for the project to conflict with the California Regional Haze Plan is limited. In addition, CARB has adopted regulations designed to reduce diesel emissions from off-road vehicles, which includes construction equipment that may be used for the Proposed Project.

In July 2007, ARB adopted a pioneering regulation aimed at reducing diesel and NO_x emissions from the State's estimated 180,000 off-road vehicles used in construction, mining, airport ground support and other industries. The Regional Haze Plan indicates that CARB's In-Use Off-Road Diesel Vehicle Regulation (adopted on July 26, 2007) would reduce particulate matter and NO_x emissions by 74 percent and 32 percent, respectively, from current levels. Off-road diesel vehicles (25 horsepower or greater) and most two-engine vehicles (except on-road two-engine sweepers) used for construction activities related to the Proposed Project would be required to comply with this regulation (CARB 2016c). Adhering to this CARB regulation for off-road diesel vehicles would reduce potential visibility impacts from construction activities related to the Proposed Project and provide consistency with the Regional Haze Plan.

Therefore, the proposed project would not conflict with or obstruct implementation of the California Regional Haze Plan.

Significance

No significant impact

Potential Impact 3.9-2 Exceedance of the Siskiyou County Air Pollution Control District emissions thresholds in Rule 6.1 (Construction Permit Standards for Criteria Air Pollutants).

Summary

Table 3.9-4 summarizes the uncontrolled emissions associated with the Proposed Project activities including dam and powerhouse deconstruction, restoration activities, and the relocation and demolition of recreational facilities. Since these project activities have the potential to overlap, their daily emissions are combined and compared to emissions thresholds in the SCAPCD's Rule 6.1 (Construction Permit Standards for Criteria Air Pollutants). Since the Yreka water pipeline relocation would occur prior to initiating drawdown of the Iron Gate Reservoir, the construction emissions from this project activity is analyzed separately.

The daily emissions estimates in Table 3.9-4 also includes construction activity related to the removal of J.C. Boyle Dam in Oregon. Due to the potential for the emissions generated from construction activity in Oregon to have air quality impacts in Siskiyou County, California, the emissions from construction activity in Oregon are conservatively added to the emissions from construction activity in California and compared to the SCAPCD's significance thresholds.

Table 3.9-4. Uncontrolled Emissions Inventories for the Proposed Project.

Phase	Peak Daily Emissions (pounds per day)[1]					
	VOC	**CO**	**NO_x**	**SO_2**	**PM_{10}**	**$PM_{2.5}$[2]**
Dam and Powerhouse Deconstruction	131	584	650	9	503	248
Restoration Activities	19	62	168	20	3	3
Recreation Facilities	12	77	85	0	17	7
Maximum Daily	162	723	**903**	29	**523**	**258**
Significance Criterion[2]	250	2,500	250	250	250	250

Source: Appendix N

Notes:

[1] Values shown in **bold** exceed the Siskiyou County Air Pollution Control District's (SCAPCD) thresholds of significance in Rule 6.1 (Construction Permit Standards for Criteria Air Pollutants).

Key:

VOC = volatile organic compounds
CO = carbon monoxide
NO_x = nitrogen oxides
SO_2 = sulfur dioxide
PM_{10} = inhalable particulate matter
$PM_{2.5}$ = fine particulate matter

As shown in Table 3.9-4, total daily emissions from the Proposed Project are estimated to exceed the SCAPCD's significance thresholds for NO_x, PM_{10}, and $PM_{2.5}$. As such, the construction emissions from the Proposed Project would be significant.

As discussed above in Section 3.9.4 *Impact Analysis Approach*, it is anticipated that the emissions from dam removal activities under the current proposal (Appendix B: *Definite Plan*) would be greater than the emissions estimates calculated for the 2012 KHSA EIS/EIR. This increase would primarily be due to haul truck engine exhaust because of the hauling distance required for the off-site disposal of building waste. As such, it is anticipated that these additional emissions would contribute to the finding of significant impacts for the emissions of NOx, PM_{10}, and $PM_{2.5}$ from the Proposed Project. It is not anticipated that these additional emissions would cause the Proposed Project to exceed the significance thresholds for VOC, CO, or SOx for the following reasons: (1) the emissions of these criteria air pollutants from the Proposed Project are well below the SCAPCD's significance thresholds (Table 3.9-4); and (2) the hauling of waste from dam removal activities only constitutes a small portion of the emissions of these criteria air pollutants (Appendix N).

As discussed above, mitigation measures were included for the Proposed Project as part of the analysis in the 2012 KHSA EIS/EIR. The mitigation measures required on and off-road construction equipment and trucks to be equipped with engines that meet certain model year emissions standards and various dust control measures. With the implementation of these mitigation measures, the 2012 KHSA EIS/EIR determined construction emissions from the Proposed Project would still result in significant and unavoidable impacts from NO_x and PM_{10}.

As noted above, the current proposal for the Proposed Project lacks sufficient detail concerning construction activities and it is too speculative to determine whether the mitigation measures proposed in the 2012 KHSA EIS/EIR are feasible and enforceable. As such, the analysis in this section does not include mitigation to minimize impacts from construction emissions generated by the Proposed Project activities. Since similar minimization measures may be implemented during project construction, it is assumed that the emissions generated by the Proposed Project would fall somewhere in the range between the uncontrolled and mitigated emissions estimates contained in Appendix N. Due to this uncertainty, the emissions of NOx, PM_{10}, and $PM_{2.5}$ from the Proposed Project are found to be significant and unavoidable.

The discussion below provides more detailed information about the emissions from the various project activities.

Dam and Powerhouse Deconstruction

Vehicle exhaust and fugitive dust emissions from dam removal activities would generate emissions of VOC, NO_x, CO, SO_2, PM_{10}, and $PM_{2.5}$ during the dam deconstruction period. The emission sources would include exhaust emissions from off-road construction equipment, on-road trucks, construction worker employee commuting vehicles, fugitive dust emissions from unpaved roads, blasting activities, and general earth-moving activities. Activities that could generate fugitive dust include on-site operation of construction equipment and removal and placement of excavated materials (cut/fill activities).

Predicted uncontrolled peak daily emission rates for VOC, NO_x, CO, SO_2, PM_{10}, and $PM_{2.5}$ for the Proposed Project are summarized in Table 3.9-5. This analysis uses the conservative assumption that the peak day of construction could occur at the same time for each dam; therefore, the peak daily emissions are additive.

Table 3.9-5. Uncontrolled Emissions Inventories for Dam and Powerhouse Deconstruction.

Location	Peak Daily Emissions (pounds per day)[1]					
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$ [2]
Iron Gate	67	272	**348**	2	210	50
Copco No. 1	27	176	129	1	174	165
Copco No. 2	22	83	113	1	17	6
J.C. Boyle	15	54	60	5	103	27
Grand Total	131	584	**650**	9	**503**	248
California Total[3]	116	531	**590**	4	**401**	221
Oregon Total	15	54	60	5	103	27
Significance Criterion[1]	250	2,500	250	250	250	250

Source: Appendix N

Notes:

[1] Values shown in **bold** exceed the Siskiyou County Air Pollution Control District's (SCAPCD) thresholds of significance in Rule 6.1 (Construction Permit Standards for Criteria Air Pollutants).

[2] Where emission factors were only provided for PM_{10}, appropriate PM size profiles were used to estimate $PM_{2.5}$ emissions.

[3] Appendix N - California total includes emissions for activities at Iron Gate Dam, Copco No. 1 Dam, and Copco No. 2 Dam.

As Table 3.9-5 shows, emissions from deconstruction of the dams would exceed the significance criteria for NOx and PM_{10}. The greatest source of NO_x emissions from each of the dams would be off-road construction equipment, followed by on-road trucks, and then employee commuting vehicles. The major sources of PM_{10} emissions would be fugitive dust from unpaved roads and then cut/fill activities. As indicated in Table 3.9-4, deconstruction of the dams would produce the majority of construction emissions that would occur from the Proposed Project.

Cofferdams would be constructed during deconstruction activities from concrete rubble, rock, and earthen materials that would come from the dam removal activities, as possible. As the cofferdams would be constructed from materials salvaged from the dam demolition activities, emissions associated with cofferdam construction would already be included in the emissions inventory. Additional emissions could occur when the cofferdams are later demolished. Due to the limited size of these structures and the fact that much of the material used to construct the coffer dams would be disposed of in close proximity to the dam sites, it is not anticipated that the additional emissions from this activity would result in a change to the significance determinations.

Following drawdown of the reservoirs and prior to the establishment of ground vegetation from reseeding, there is the potential for windblown dust to be generated from the exposed sediment deposits remaining in the reservoirs. Once reseeding occurs, it typically takes a minimum of four weeks for vegetation to be established to reduce the potential for windblown dust. Considering that reservoir drawdown would occur in the winter months (January to March), it is anticipated that the seasonally wet conditions would substantially reduce the potential for windblown dust until the establishment of vegetation. However, there is the potential for short-term impacts from windblown dust not accounted for in the particulate matter emission estimates in Table 3.9-5 and Appendix N, Table M-19. As such, this additional source of particulate matter emissions would contribute to the finding of significant and unavoidable impacts for particulate matter emissions from the Proposed Project.

Restoration Activities

Restoration actions included in the Reservoir Area Management Plan (Appendix B: *Definite Plan – Appendix H*) could result in short-term increases in criteria pollutant emissions from vehicles exhaust and fugitive dust from the use of helicopters or other small aircraft, trucks, and barges. Following drawdown of the reservoirs, revegetation efforts would be initiated to support establishment of native wetland, riparian, and upland species on newly exposed riverbank sediment and surrounding areas. Additional fall seeding may be necessary to supplement areas where spring hydroseeding was unsuccessful (Appendix B: *Definite Plan*).

Emissions from ground support equipment were estimated using the emission factors for off-road engines identified above and EMFAC model for on-road motor vehicle emissions. The majority of peak daily emissions that would be generated by the restoration activities would occur from the use of barges or aircraft for reseeding during and following reservoir drawdown. As the use of barges would cease when reservoir levels become too low (by March of dam removal year 2), there would not be an overlap between the use of the barges and the peak construction activities related to dam removal (May through September of dam removal year 2) (Table 2.7-1). Overlap that could occur between the restoration activities and peak construction activities related to dam removal, would include the use of ground and aerial equipment for reseeding (Table 3.9-4). Table 3.9-6 summarizes emissions from restoration activities.

Table 3.9-6. Uncontrolled Emissions from Restoration Activities .

Phase	Peak Daily Emissions (pounds per day)					
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$[2]
Ground Equipment	3	8	15	2	0	0
Barges	16	54	153	18	3	3
Air craft	15	39	3	1	0	0
Maximum Daily[1]	19	62	168	20	3	3

Source: Appendix N
Notes:
[1] Barge and aerial application would not happen simultaneously; therefore, maximum daily emissions summarizes the peak day that consists of ground equipment and barges operating at the same time.

Recreation Facilities
Relocation and demolition of various recreation facilities would produce criteria pollutant emissions from vehicle exhaust and fugitive dust. The demolition of the Lower Klamath Project recreation facilities would change recreation opportunities from lake-based recreation to river-based recreation. This change would require several recreation facilities to be reconstructed or demolished. On- and off-road construction equipment would be used to complete these activities, which would occur after the dam demolition actions.

Emissions from relocation and demolition of the various recreation facilities were estimated using the CalEEMod emissions model. As the relocation and demolition of recreational facilities could occur during dam demolition, it is assumed there would be an overlap with the peak construction activities related to dam removal (Table 3.9-4). Table 3.9-7 summarizes emissions from the relocation and demolition of recreation facilities.

Table 3.9-7. Uncontrolled Emissions from Relocation and Demolition of Recreation Facilities.

Location	Peak Daily Emissions (pounds per day)					
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$[2]
J.C. Boyle	4	32	31	0	4	1
Copco No. 1 Reservoir	2	13	16	0	4	2
Iron Gate Reservoir	6	32	38	0	9	4
Total Emissions	12	77	85	0	17	7

Source: Appendix N

City of Yreka Water Supply Pipeline Relocation
Construction of a new water supply pipeline for Yreka would produce criteria pollutant emissions from vehicle exhaust and fugitive dust. On- and off-road construction equipment would be used to complete the relocation and construction of the Yreka water supply pipeline. Construction of the pipeline would occur prior to initiating drawdown of the Iron Gate Reservoir. It is estimated the replacement of the water supply pipeline would last approximately one month. As such, emissions from this project activity would

not overlap with peak daily emissions due to dam removal construction activities (Table 2.7-1) (Section 2.7.7 *City of Yreka Water Supply Pipeline Relocation*). The Sacramento Metropolitan Air Quality Management District's Road Construction Emissions Model (2009) was used to estimate emissions associated with grubbing/land clearing, grading/excavation, and other phases. Table 3.9-8 summarizes emissions from replacement of the Yreka water supply pipeline.

Table 3.9-8. Uncontrolled Emissions from Construction of the Yreka Water Supply Pipeline.

Phase	Peak Daily Emissions (pounds per day)					
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$
Grubbing/Land Clearing	2.3	9.3	16.4	--	10.1	2.6
Grading/Excavation	2.8	16.5	18.4	--	10.3	2.7
Drainage/Utilities/Sub-Grade	2.2	11.3	14.4	--	10.2	2.6
Maximum	2.8	16.5	18.4	--	10.3	2.7
Significance Criterion	250	2,500	250	250	250	250

Source: Appendix N

As shown in Table 3.9-8, emissions from replacement of the Yreka water supply pipeline would not exceed the SCAPCD's significance thresholds. Therefore, emissions from construction of the Yreka water supply pipeline would be less than significant.

Other Project Components

Construction activities associated with implementation of the Other Project Components identified in Section 7 of the Definite Plan, would produce additional emissions from vehicle exhaust and fugitive dust. These activities include, but are not limited to, improvements to roads, bridges and culverts that would be affected by the Proposed Project, relocation or elevation of structures that would be subject to flood risk after removal of the dams, and the modification of downstream water intakes to protect them from passing sediment after removal of the dams. On- and off-road construction equipment would be used to complete the necessary construction.

Due to the limited nature of these additional project components, they are anticipated to produce minor emissions compared to the dam and powerhouse demolition activities. The emissions estimates for the relocation of the Yreka water supply pipeline are considered to be representative of the emissions that would be generated by these project components.

Most of these project components are planned to take place before or after primary construction and deconstruction associated with the Proposed Project. As such, they would not overlap with the peak construction activity related to the dam and powerhouse deconstruction, restoration activities, and the relocation and demolition of recreation facilities. However, there is the potential that some of these project components may overlap with the peak construction activity. To the extent that this occurs, the additional emissions produced by these project components would contribute to the significant and unavoidable significance determination related to emissions of NOx, PM_{10}, and $PM_{2.5}$ generated during peak construction activity.

Therefore, air quality impacts from the implementation of the other project components would be significant and unavoidable.

Significance
Significant and unavoidable impact

Potential Impact 3.9-3 Short-term cumulative increase in criteria pollutants for which the Siskiyou County Air Pollution Control District is non-attainment.
Direct air quality impacts from construction activities occurring during the Proposed Project would be limited to Siskiyou County, California, which is designated as attainment or unclassified for all federal and state ambient air quality standards (Table 3.9-2). As such, the Proposed Project would not result in a cumulatively considerable net increase of any criteria air pollutant for which Siskiyou County is non-attainment (including releasing emissions which exceed quantitative thresholds for ozone precursors).

Significance
No significant impact

Potential Impact 3.9-4 Short-term exposure of sensitive receptors to substantial toxic air contaminant concentrations.
The area surrounding Iron Gate Dam, Copco No. 1 Dam, and Copco No. 2 Dam is sparsely populated with few sensitive land uses. The nearest sensitive land uses are recreational facilities located at Copco No. 1 and Iron Gate reservoirs, along with hiking trails around the Fall Creek development (Section 3.20 *Recreation*). The next closest sensitive land uses include scattered residences that are located along the Klamath River. The closest homes to construction sites are located over 2,000 feet from Copco No. 1 Dam, over 3,500 feet from Copco No. 2 Dam, and over 4,000 feet from Iron Gate Dam. As noted above, there are also several modular homes located at Copco Village that are currently occupied by PacifiCorp staff. These homes are located within the Limits of Work and range from 850 feet to 2,200 feet west of the Copco No. 2 Powerhouse (Figure 2.7-2). Prior to the beginning of dam deconstruction activities, these homes would be vacated.

The Proposed Project has the potential to create a significant hazard to sensitive receptors (e.g., residents and recreationists) near the construction sites through exposure to substantial pollutant concentrations such as ROG, NO_X and particulate matter and/or other toxic air contaminants during construction activities. Construction activities would involve the use of a variety of gasoline or diesel-powered equipment that emits exhaust fumes. Sensitive receptors in the vicinity of the construction sites would potentially be exposed to nuisance dust and heavy equipment emission diesel exhaust during construction. The duration of exposure would be short and exhaust from construction equipment dissipates rapidly. Sensitive receptors within a quarter-mile (1,320 feet) of construction activities would be at the greatest risk for exposure to fugitive dust and diesel exhaust during construction.

Since the recreation facilities near the construction sites would be closed during dam removal activities, it is not anticipated that recreationists would be exposed to substantial pollutant concentrations during construction activity. As noted above, the closest residences are located over 2,000 feet away from the construction sites. According to the USEPA, the majority of fugitive dust generally settles out of the atmosphere within

300 feet of the source, with larger particles traveling less distance and smaller particles traveling a longer distance (USEPA 1995). According to the CARB, concentrations of mobile-source diesel particulate matter emissions are typically reduced by 70 percent at a distance of approximately 500 feet (CARB 2005). Due to the low density of residential uses in the project area, and the fact that the nearest residences are well over a quarter mile (1,320 feet) from the construction sites, it is not anticipated that sensitive receptors residing at the closest residences would be exposed to substantial toxic air contaminant concentrations during construction activities. Therefore, the exposure of sensitive receptors to pollutant concentrations during construction activity is less than significant.

Significance

No significant impact

Potential Impact 3.9-5 Short-term exposure to objectionable odors near construction sites.

The Siskiyou County Air Pollution Control District addresses odor impacts through Rule 4.2 (Nuisance Section 24243), which states "No person shall discharge from any source whatsoever, such quantities of air contaminants or other material which cause injury, detriment, nuisance or annoyance to any considerable number of persons or to the public or which endanger the comfort, repose, health or safety of any such persons or the public or which cause or have a natural tendency to cause injury or damage to business or property." Rule 4.2 does not apply to odors emanating from agricultural operations in the growing of crops or raising of fowl or animals (CARB 2016a).

The following odors could result from the Proposed Project:

- Odors from exposed sediments (including algae) in the reservoir footprints; and
- Odors from construction equipment/vehicle exhaust.

Both of these odor sources would be likely to generate minor odor impacts relative to land use types capable of generating significant odor impacts (e.g., wastewater treatment plant, sanitary landfill, petroleum refinery, rendering plant, food packaging plant) (SMAQMD 2016).

The Proposed Project would ultimately drain Iron Gate, Copco No. 1, and Copco No. 2 reservoirs and expose the underlying sediments. Because the reservoir sediment deposits contain unoxidized organic matter from algal detritus (organic content of the sediments is on average 2.7 to 5.1 percent by mass [GEC 2006]), earthy or sulfide odors (e.g., tidal marsh sediment odors at low tide), may be evident during or immediately following reservoir drawdown while the exposed sediments dry out and new vegetation is established. There is the potential that these odors could temporarily impact nearby land uses such as the closest recreational facilities and residential uses. These odor impacts have the potential to cause nearby recreationists and residents to reduce outdoor activity or take other actions to avoid detection of the odors (e.g., keep windows closed). The level of impact would be dependent on proximity to the reservoirs and wind patterns during and immediately following reservoir drawdown (i.e., winter and spring months). Within a relatively short amount of time (i.e., days to a few weeks), the sediment surfaces would oxidize as they are exposed to air and the organic compounds causing the odors would be broken down. Due to the low density of development in the vicinity of the reservoirs, the relatively low number of recreationists in the vicinity of the Lower Klamath Project reservoirs during winter and spring months) the short-term nature of the anticipated odor impacts (days to a few weeks during dam removal year 2), it is not anticipated that the Proposed Project would create objectionable odors affecting a substantial number of people and thus would not result in a significant impact.

As discussed in Section 3.20 *Recreation*, two-thirds of recreational users of the Klamath River reservoirs that were surveyed responded that the algae blooms in the reservoirs produced bad odors. Reservoir drawdown under the Proposed Project would occur during winter months (January–March) (Table 2.7-1) when intense algae blooms do not typically occur in lakes and reservoirs in general, or in the Lower Klamath Project reservoirs in particular (Section 3.2 *Water Quality* and Section 3.4 *Phytoplankton and Periphyton*). Despite a very low likelihood of occurrence, algae blooms could be present as reservoir drawdown occurs and as the water level lowers in the reservoirs, algae would settle on the exposed sediments. If this does occur, it is anticipated that the algae and underlying sediments would dry out quickly (i.e., within days to weeks), which would substantially reduce any odors generated by decaying algae. Similar to odors from the reservoir sediments, it is not anticipated that a substantial number of people would be impacted due to the low density of development in the area and the short-term nature of the odor impacts. Ultimately, the Proposed Project is anticipated to substantially reduce the annual occurrence of odors from algae blooms since this section of the Klamath River would be restored to a free-flowing condition.

During construction, there is the potential for the generation of objectionable odors in the form of construction equipment/vehicle exhaust in the immediate vicinity of the construction sites at the three dams (Copco No. 1, Copco No. 2, and Iron Gate). However, these emissions would rapidly dissipate and be diluted by the atmosphere downwind of the site. As noted above, CARB estimates that concentrations of mobile-source diesel particulate matter emissions are typically reduced by 70 percent at a distance of approximately 500 feet (CARB 2005). At this distance from the construction sites, there would also be a substantial reduction in odors generated by exhaust emissions. The nearest residences to the dam construction sites are over 2,000 feet away, which would provide adequate distance for the dissipation of odors from construction activity. Due to the low density of development in the areas within and adjacent to the Limits of Work, intervening topography and vegetation, and the rapid dissipation of odors from construction activity, it is not anticipated that these odors would impact a substantial number of people.

Significance

No significant impact

3.9.6 References

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