

8B.0 NATURAL ENVIRONMENT: AIR QUALITY

8B.1 OVERVIEW

This section contains a description of air quality issues in Tehama County, discusses the regulations governing air quality, and makes recommendations for future planning in regards to air quality.

LEGAL BASIS AND REQUIREMENTS

The State of California does not require air quality elements as one of the seven elements mandated for general plans. Air quality is mentioned as an optional issue in the "Conservation" element. Nonetheless, consideration of air quality issues and strategies in general plans has been increasingly cited by air districts as a necessary means of addressing the long-term and cumulative influences of population growth on air quality. Although air quality elements are not mandated by state planning laws, general plans are required by law to be consistent with regional air quality plans.

8B.2 PURPOSE AND METHODOLOGY

The purpose of this analysis is to provide a synopsis of current air quality conditions within Tehama County with a historical context, and to identify important issues that should be addressed within the General Plan. The primary source of air quality information is the Tehama County Air Pollution Control District. The Tehama County Air Pollution Control District (TCAPCD) is a regional agency that regulates stationary sources of air pollution within Tehama County and is responsible for air quality planning within the County. The planning staff of the TCAPCD provided background information and historical context utilized in the preparation of the air quality discussion.

8B.3 EXISTING SETTING

AIR POLLUTION CLIMATOLOGY

The Sacramento Valley Air Basin (SVAB) is the northern half of California's Great Valley and is bordered on three sides (west, north and east) by mountain ranges, with peaks in the eastern range above 10,000 feet. The SVAB is approximately 13,700 square miles and essentially a smooth valley floor with elevations ranging from 40 to 500 feet. The rolling valley is interrupted by the Sutter Buttes, an area of 80 square miles in northern Sutter County, which rise abruptly to more than 2,100 feet above the valley floor.

Tehama County is located in the northern area of the Sacramento Valley, approximately midway between Sacramento and the Oregon border. The air basin of the Sacramento Valley is about 200 miles long in a north-south direction, and has a maximum width of about 150 miles, although the width of the valley floor only averages about 50 miles.

Tehama County's climate is considered Mediterranean, which is characterized by hot, dry summers and cool, wet winters. Between mid-April and mid-October, significant precipitation is unlikely and high temperatures often peak at over 100 degrees F with lows in the high 50s and low 60s. During the winter, highs are typically in the 60s with lows in the 30s.

Wind direction is primarily up- and down-valley (roughly north-south) due to the channeling effect of the mountains to either side of the valley. During the summer months, surface air movement is from the south, particularly during the afternoon hours. During the winter months, wind direction is more variable.

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Inversions occur in the SVAB with great frequency in all seasons. The most stable inversions occur in late summer and fall. The summertime inversions are often the result of marine air pushing under an overlying warm air mass. These are termed "marine inversions" and are generally accompanied by brisk afternoon winds, which provide good air circulation. In contrast, many autumn inversions are the result of warm air subsiding in a high-pressure cell where accompanying light winds do not provide adequate dispersion. Photochemical smog in the early summer and fall is enhanced by the almost unbroken succession of warm sunny days during these seasons.

Carbon monoxide, oxides of nitrogen, particulate matters, and lead particulate concentrations in the late fall and winter are highest when there is little interchange of air between the Valley and the coast and when humidity is high following winter rains. This type of weather is associated with radiation fog, known as "tule fog," when temperature inversions at ground level persist over the entire Valley for several weeks and air movement is virtually absent.

AIR BASIN AND AIR DISTRICT

Tehama County is part of the Northern Sacramento Valley Air Basin, which also consists of Shasta, Butte, Glenn, Colusa, Sutter, and Yuba Counties. The Tehama County Air Pollution Control District (TCAPCD) is a regional agency that regulates stationary sources of air pollution within the county. The District's boundaries are the same as Tehama County's.

The TCAPCD's main purpose is to enforce local, state, and federal air quality laws, rules and regulations in order to meet Ambient Air Quality Standards (AAQS). The District adopts and enforces controls on stationary sources of air pollutants through its permit and inspection programs and regulates agricultural burning. Other District responsibilities include monitoring air quality, preparation of clean air plans and responding to citizen air quality complaints.

HISTORICAL BACKGROUND

Air pollution control and planning began in earnest in 1967 with the passage of the Federal Clean Air Act. In 1970 the National Ambient Air Quality Standards (NAAQS) were established for six pollutants. These pollutants are commonly referred to as "criteria" pollutants because criteria documents, which establish the relationship between exposure and effects on human health, have been prepared for each contaminant. The Act requires states exceeding the NAAQS to prepare air quality plans showing how the standards were to be met by 1987. The Act was amended in 1977 and in 1990 to extend the deadline for compliance. Failure to submit and implement an acceptable plan meant a state could be denied federal highway funding.

The State of California has its own air quality standards and air pollution planning programs. In 1988 the California legislature passed the California Clean Air Act, which required air districts to develop air quality plans for the state standards. In general, the California Clean Air Act required the reduction of air pollutants by five percent or more per year or the implementation of "all feasible measures" to meet the state air quality standards as expeditiously as possible.

AMBIENT AIR QUALITY STANDARDS

Both the U.S. Environmental Protection Agency and the California Air Resources Board have established ambient air quality standards for common pollutants. These ambient air quality standards are levels of contaminants, which represent safe levels that avoid specific adverse health effects associated with each pollutant.

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The federal and California state ambient air quality standards are summarized in **Table 8B-1** for important pollutants. The federal and state ambient standards were developed independently, although both processes attempted to avoid health-related effects. As a result, the federal and state standards differ in some cases. In general, the California state standards are more stringent. This is particularly true for ozone and PM₁₀.

The U.S. Environmental Protection Agency established new national air quality standards for ground-level ozone and for fine particulate matter in 1997. The existing 1-hour ozone standard of 0.12 PPM (microns or less) is to be phased out and replaced by an 8-hour standard of 0.08 PPM. Implementation of the 8-hour standard was delayed by litigation, but was determined to be valid and enforceable by the U.S. Supreme Court in a decision issued in February of 2001.

In 1997, new national standards for fine Particulate Matter (diameter 2.5 microns or less) were adopted for 24-hour and annual averaging periods. The current PM₁₀ standards were to be retained, but the method and form for determining compliance with the standards were revised.

The State of California regularly reviews scientific literature regarding the health effects and exposure to PM and other pollutants. On May 3, 2002, the California Air Resources Board (CARB) staff recommended lowering the level of the annual standard for PM₁₀ and establishing a new annual standard for PM_{2.5} (particulate matter 2.5 micrometers in diameter or smaller). The new standards became effective on July 5, 2003.

TOXIC AIR CONTAMINANTS

In addition to the criteria pollutants discussed above, toxic air contaminants (TACs) are another group of pollutants of concern. Unlike criteria pollutants, no safe levels of exposure to TACs can be established. There are many different types of TACs, with varying degrees of toxicity. Sources of TACs include industrial processes such as petroleum refining and chrome plating operations, commercial operations such as gasoline stations and dry cleaners, and motor vehicle exhaust.

Public exposure to TACs can result from emissions from normal operations, as well as accidental releases of hazardous materials during upset conditions. The health effects of TACs include cancer, birth defects, neurological damage and death.

SENSITIVE RECEPTORS

A sensitive receptor is a location where human populations, especially children, seniors, and sick persons are present and where there is a reasonable expectation of continuous human exposure to pollutants.

AMBIENT AIR QUALITY

The TCAPCD currently operates two monitoring stations in Red Bluff, which measure ozone and inhalable particulate matter (PM₁₀). Exceedences of the state/national standards during the period 2000-2002 are shown in **Table 8B-2**.

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**TABLE 8B-1
FEDERAL AND STATE AMBIENT AIR QUALITY STANDARDS**

POLLUTANT	AVERAGING TIME	FEDERAL PRIMARY STANDARD	STATE STANDARD
Ozone	1-Hour	0.12 ppm	0.09 ppm
	8-Hour	0.08 ppm	--
Carbon Monoxide	8-Hour	9.0 ppm	9.0 ppm
	1-Hour	35.0 ppm	20.0 ppm
Nitrogen Dioxide	Annual	0.05 ppm	--
	1-Hour	--	0.25 ppm
Sulfur Dioxide	Annual	0.03 ppm	--
	24-Hour	0.14 ppm	0.05 ppm
	1-Hour	--	0.5 ppm
PM ₁₀	Annual	50 ug/m ³	30ug/m ³
	24-Hour	150 ug/m ³	50 ug/m ³
PM _{2.5}	Annual	15 ug/m ³	--
	24-Hour	65 ug/m ³	--
Lead	30-Day Avg.	--	1.5 ug/m ³
	Month Avg.	1.5 ug/m ³	--

ppm = parts per million

ug/m³ = Micrograms per Cubic Meter

**TABLE 8B-2
AIR QUALITY DATA, 2001-2003**

POLLUTANT	STANDARD	DAYS STANDARD WAS EXCEEDED		
		2001	2002	2003
Ozone	Federal 1-Hour	0	0	0
Ozone	State 1-Hour	0	4	4
Ozone	Federal 8-Hour	0	1	1
PM ₁₀	Federal 24-Hour	0	0	0
PM ₁₀	State 24-Hour	3	7	1

Source: California Air Resources Board, Aerometric Data Analysis and Management (ADAM), 2004.

AIR POLLUTANTS OF CONCERN IN TEHAMA COUNTY

The state and national ambient air quality standards cover a wide variety of pollutants. Only a few of these pollutants are problems in Tehama County, either due to the strength of the emission or the climate of the region. The TCAPCD currently operates two air-monitoring stations in Red Bluff for measuring ozone and inhalable particulate matter (PM₁₀).

A significant impact to air quality in Tehama County involves the location of agricultural operations in close proximity to sensitive areas, such as wildlife habitat and residential land uses. Agricultural activities frequently involve the application of pesticides or fertilizers or the concentration of large numbers of animals. Odors and chemical particulates may then be

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carried by the wind into nearby areas. Similarly, dust and dirt from plowing or harvesting operations may also impact adjacent land uses. These impacts are particularly applicable to the I-5 corridor planning areas of the County where significant growth is occurring adjacent to valuable agricultural uses.

Additional air quality impacts will inevitably occur merely as the result of Tehama County growth. More people equal more cars, which in turn implies increase air pollution from auto exhaust.

Dust and smoke from timber operations also pose threats to air quality. Dust may result from various harvesting activities. Smoke from burning of vegetation emits a variety of gasses and particles into the air, which affects visibility and causes odors. These impacts, however, are highly localized and restricted to the Eastern and Western Planning Areas.

Ozone

Motor vehicles are the single largest source of ozone precursors emissions in Tehama County. Ground level ozone, which is often referred to as smog, is not emitted directly, but is formed in the atmosphere through complex chemical reactions between nitrogen oxides (NO_x) and reactive organic gases (ROG) in the presence of sunlight. Obviously, the main sources of ozone within the Tehama County span the major transportation corridors of Interstate-5 and Highway 99.

Inhalable Particulate Matter (PM₁₀)

Particulate matter includes a wide range of solid or liquid particles, including smoke, dust, aerosols and metallic oxides. There are many sources of particulate matter emissions, including combustion, industrial processes, grading and construction, and motor vehicles.

Unpaved road dust is the single largest source of PM₁₀ in Tehama County. Wood burning in fireplaces and stoves is a significant source of particulate matter, particularly during episodes when levels are highest.

8B.4 REGULATORY FRAMEWORK

FEDERAL/STATE CLEAN AIR ACT

Both federal and state governments have enacted laws mandating the identification of areas not meeting the ambient air quality standards and development of regional air quality plans to eventually attain the standards. Under the federal Clean Air Act, Tehama County is currently considered attainment or unclassified for all national ambient air quality standards. It is a non-attainment area for the state ambient air quality standards for ozone and PM₁₀. The air districts of the NSVAB have jointly prepared and adopted a uniform air quality attainment plan addressing ozone and PM₁₀ (NSVAB, 2003).

COUNTY REGULATIONS

The TCAPCD is a local air quality agency. The District adopts and enforces controls on stationary sources of air pollutants through its permit and inspection programs and regulates agricultural burning. Other District responsibilities include monitoring air quality, preparation of clean air plans and responding to citizen air quality complaints.

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The District participates with other air districts in the Northern Sacramento Valley Air Basin in formulating open burning plans and attainment plans for achieving and maintaining state ambient air quality standards. Control measures and mitigation of indirect source emissions are developed with as much uniformity as possible, considering unique differences among the various rural and urban areas.

8B.5 ISSUES AND OPPORTUNITIES

AIR QUALITY

Continued Ozone Attainment

Future maintenance of the County's attainment status for the state one-hour ozone standard is threatened by continuing growth. The majority of man-made ozone precursors are emitted from the tailpipes of automobiles. Automobile use has been growing at a rapid rate throughout the state in general, including Tehama County. Although newer vehicles are cleaner and older vehicles are being retired, this increased automobile use has the strong potential to outstrip the reductions in emissions from other sources.

Potential for Increased PM₁₀ Emissions

The largest existing sources of PM₁₀ in Tehama County are vehicles traveling on unpaved roads, residential wood burning and paved road dust. There are currently no control programs for any of these sources beyond statewide standards on new wood-burning devices. Also, each of these sources is directly proportional to population, and can be expected to grow in the future. Recent trends for rural subdivisions to build unpaved private roads exacerbates the problem, as does some homeowner's attempts to become energy self-sufficient by using wood-burning devices as a primary means of space heating.

Diesel Exhaust Particulate

In 1998, after a 10-year scientific assessment process, the Air Resources Board identified particulate matter from diesel-fueled engines as a toxic air contaminant (TAC). The state of California has begun a program of identifying and reducing risks associated with particulate matter emissions from diesel-fueled vehicles. The plan consists of new regulatory standards for all new on road, off-road and stationary diesel-fueled engines and vehicles, new retrofit requirements for existing on-road, off-road and stationary diesel-fueled engines and vehicles, and new diesel fuel regulations to reduce the sulfur content of diesel fuel as required by advanced diesel emission control systems.

8B.6 IMPLICATIONS FOR THE GENERAL PLAN

- There are few controls in place to reduce impacts of population growth on ozone precursor or PM₁₀/PM_{2.5} emissions.
- The Plan should relate transportation, land use, and jobs/housing balance such that Tehama County will have continuously improving air quality.
- Unpaved road travel is a major source of particulate emissions that is generally uncontrolled and could be greatly increased by population growth in rural parts of the County.