



Treasure Valley

Air
Quality

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Agency Purpose

The Idaho Division of Environmental Quality (DEQ) is the state agency responsible for implementing environmental protection laws and programs. The DEQ's mission is to preserve the quality of Idaho's air, land, and water for use and enjoyment today and in the future. Reducing threats to human health and the environment is at the center of all DEQ activities.

With respect to air quality, this includes regulating sources that generate pollution, monitoring the quality of Idaho's air, developing plans to solve air pollution problems, ensuring Idaho meets federal air quality standards, and planning for the protection of air quality in Idaho.

Sources of Data for Figures

1. *Treasure Valley Air Pollution Monitoring Sites*, DEQ, 1998
2. *How Particulate Matter Affects You*, DEQ, 1998
3. *Ozone and Particulate Matter Health Problems*, DEQ, 1998
4. *Inversion*, DEQ, 1998
5. *Treasure Valley Emissions Sources—1995*, ICF Kaiser [PM₁₀ Area and Mobile Emissions Inventory](#), DEQ [PM₁₀ Industrial Emissions Inventory](#), and APA [CO Emissions Inventory](#)
6. *Average Miles Traveled per Person per Day in Ada County is Increasing*, APA [CO Emissions Inventory](#), and ICF Kaiser [PM₁₀ Area and Mobile Emission Inventory](#)
7. *Vehicle Contributions to Ada and Canyon County Air Pollution*, ICF Kaiser [PM₁₀ Area and Mobile Emissions Inventory](#)
8. *Decline in Wood Smoke Contribution to PM₁₀*, DEQ [Northern Ada County/Boise Area and Mobile Source Emission Inventory 1987—TSP and PM₁₀, August 1990](#) and ICF Kaiser [PM₁₀ Area and Mobile Emissions Inventory](#)
9. *Agricultural Contributions to Ada and Canyon County Air Pollution*, ICF Kaiser [PM₁₀ Area and Mobile Emissions Inventory](#)
10. *Industry Contributions to Ada and Canyon County Air Pollution*, DEQ [PM₁₀ Industrial Emissions Inventory](#)
11. *Construction Contributions to Ada and Canyon County Air Pollution*, ICF Kaiser [PM₁₀ Area and Mobile Emissions Inventory](#)
12. *Average Annual PM₁₀ Concentrations for Boise and Nampa*, DEQ Monitoring Results
13. *Computer Simulation of PM₁₀ Concentrations: 1995 Emission Levels, 1991 Weather Patterns*, Wyndvalley and ISCST3 Modeling Results, DEQ 1998
14. *Number of Days with CO Levels Above Federal Air Quality Standards*, DEQ Monitoring Results
15. *CO Produced by Each Vehicle Is Declining, but Total Amount of CO Will Increase as Vehicle Use Grows*, EPA Office of Mobile Sources, [AP-42 Air Pollution Emissions Factors 1998](#) and APA [Air Quality Program for the Treasure Valley](#), March 1998

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Summary

Air pollution threatens the health of human beings and other living things. Many air pollutants are not visible, but can still do harm. Pollutants in the air create smog and acid rain, aggravate respiratory conditions, and can even cause cancer or birth defects.

In the past, Ada County measured levels of some pollutants that were above the federal health based standards. During the early 1970's exceedances of health based air quality standards were measured between 60 and 80 days each year, mainly for carbon monoxide. A significant number of particulate matter exceedances were also measured. Because of this, Ada County was designated a "nonattainment area" for these pollutants. Nonattainment areas are subject to stricter regulations on activities that cause air pollution. They are also required to implement control strategies designed to resolve the problem, and report the progress at regular intervals.

Monitoring in Canyon County began in 1993. Although Canyon County is not included in the nonattainment area, it is within the same airshed. Levels of air pollution there are similar to, and sometimes higher than Ada County levels.

The solutions employed in Ada County have been very effective. Programs such as the Vehicle Inspection and Maintenance Program and the Air Quality Advisory Program have helped to reduce pollution from traditional sources like wood burning and vehicles. Federal vehicle emissions standards have also served to reduce pollution. No violations of air quality standards have been measured since 1991, and overall air quality is much better.

While major improvements have been made in the Treasure Valley, the area faces new obstacles in maintaining good air quality. Recent studies on the health impacts of air pollution have

led to new and more stringent federal regulations. The amount of air pollution generated each day continues to increase as the valley grows. In addition, weather patterns have a tremendous impact on local air quality. Stagnation episodes, or inversions, which can lead to high levels of air pollution, occur more frequently here than in other Western cities.

Several air quality issues present upcoming challenges in maintaining acceptable air quality:

Particulate Matter

- ❖ PM_{10} —airborne particles 10 microns or less. Particulate matter concentrations have declined. In addition, federal standards on this pollutant have recently been eased in response to studies that show this pollutant has less serious health effects. However, recent modeling predicts that if weather patterns stagnate, high levels of particulate matter could occur. The three largest sources of PM_{10} in the area are automobiles, agricultural activities, and construction activities.
- ❖ $PM_{2.5}$ — The U.S. Environmental Protection Agency (EPA) recently established guidelines for a smaller category of particulate matter, 2.5 microns or less. These new standards pose a challenge to urban areas across the country. Many regions, including the Treasure Valley, foresee difficulty meeting this requirement. In the Treasure Valley studies indicate that up to 50% of particulate matter may fall into the 2.5 size category on the most polluted days. Monitoring of this pollutant has just begun.

A 1997 Treasure Valley public opinion survey found that more than 90% of respondents felt that improving air quality was important.

Carbon Monoxide

- ❖ The primary source of carbon monoxide continues to be automobiles. Despite significant improvements in vehicle technology, carbon monoxide emissions are expected to rise due to increasing traffic and congestion. This presents a renewed risk that safe levels of carbon monoxide may be exceeded.

Ozone

- ❖ Current levels are unknown, but conditions favorable to ozone formation are present. Ground level ozone is one of the primary components of urban smog. Monitoring for ozone will begin soon after the year 2000.

Nitrogen Oxides

- ❖ Monitoring shows that levels of nitrogen dioxide are well below the standards. However, because nitrogen oxides can contribute to the formation of ozone, Ada county vehicles will be tested for nitrogen oxide emissions beginning in the year 2000.

Visibility

- ❖ Particulate matter and other pollutants combine to create regional haze. Although haze does not have a direct effect on public health, it can have an impact on aesthetics and economics, and may indicate unhealthy conditions.

Vehicle Use

- ❖ Motor vehicles contribute the largest portion of several pollutants. Vehicle emissions are rising quickly as vehicle use

grows. Growth in vehicle use is increasing much more quickly than population.

Year-round Pollution Levels

- ❖ In the past significant levels of air pollutants were measured only during winter stagnation events. While overall pollution levels have improved, late summer and early fall regional haze appears to be on the rise.

Toxic Air Pollutants

- ❖ The EPA is beginning a new focus on regulating toxic air pollution.

DEQ will continue to work with the communities of the Treasure Valley to manage air quality. Much improvement has occurred over the past twenty years, but continued effort is necessary. Communities must continue to be active in protecting air quality. This can be accomplished by developing ordinances and policies to reduce pollution, and planning communities in a way that reduces reliance on vehicles.

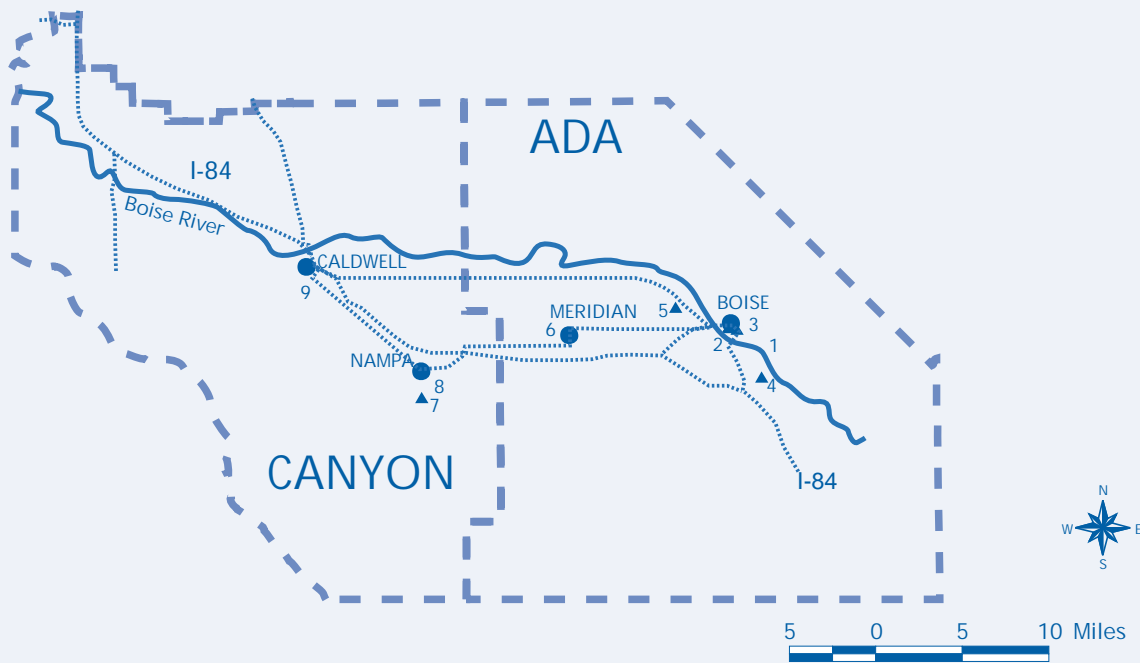
Individuals can also contribute to improvements in air quality. Driving less, maintaining a clean running vehicle, and committing to using less energy and resources can all help to reduce air pollution in the Treasure Valley.

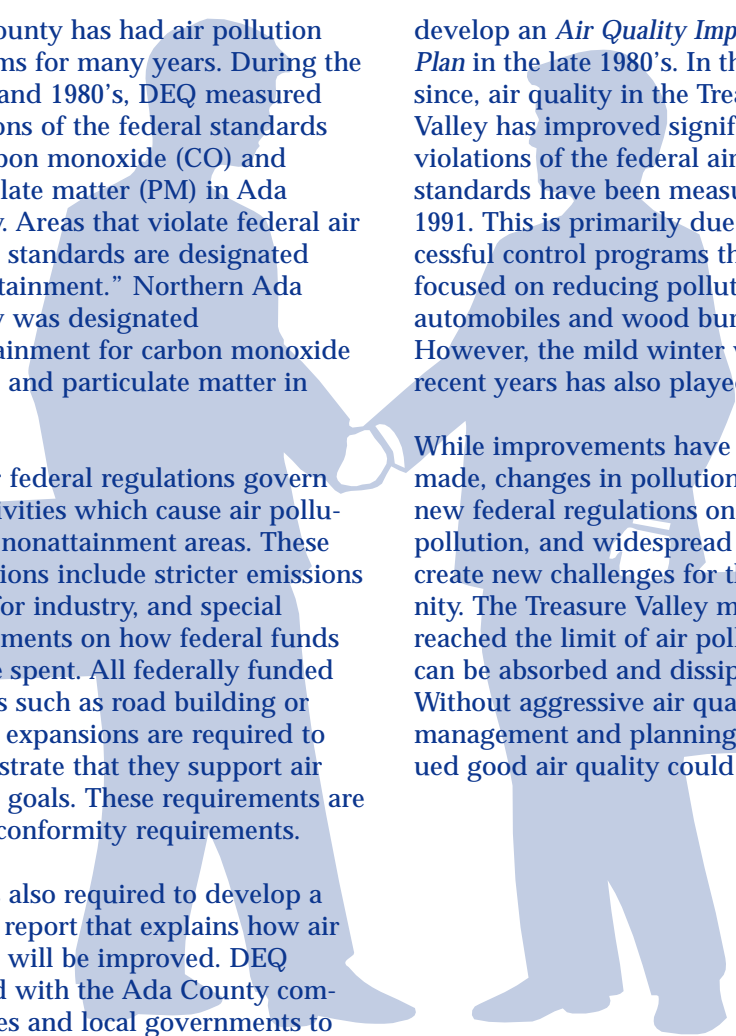
Introduction

This report focuses on air quality in the Treasure Valley. The Treasure Valley is an area in southwest Idaho that includes Ada and Canyon Counties, as well as the state's largest city, Boise. During the 1990's, the area experienced tremendous growth and urbanization. In 1990, the population of the two counties was 296,000. By 1995, the population was 361,000, an increase of more than 20%. Forecasts predict the population of these counties will increase an additional 50% between 1995 and 2015. Ada County has roughly twice the population of Canyon County. It has a broad economic base with an emphasis on high tech industries, services, and government. Canyon County is currently more rural with its economy dependent on agriculture, but it is undergoing urbanization. Many Canyon County residents commute to Boise daily.

Treasure Valley Air Pollution Monitoring Sites 1998

Site	Pollutant	Site	Pollutant
1. Eastman Parking Garage	Carbon Monoxide	6. Meridian and First Street	PM10
2. 16th and Front	Nitrogen Dioxide	7. Northwest Nazarene College	PM2.5
3. Boise Fire Station #5	PM10	8. Nampa Fire Station	PM10
4. White Pine Elementary	PM2.5	9. Syringa Middle School	PM2.5
5. Mountain View Elementary	PM2.5 & PM10		





Ada County has had air pollution problems for many years. During the 1970's and 1980's, DEQ measured violations of the federal standards for carbon monoxide (CO) and particulate matter (PM) in Ada County. Areas that violate federal air quality standards are designated "nonattainment." Northern Ada County was designated nonattainment for carbon monoxide in 1977 and particulate matter in 1987.

Stricter federal regulations govern the activities which cause air pollution in nonattainment areas. These regulations include stricter emissions limits for industry, and special requirements on how federal funds may be spent. All federally funded projects such as road building or airport expansions are required to demonstrate that they support air quality goals. These requirements are called conformity requirements.

DEQ is also required to develop a special report that explains how air quality will be improved. DEQ worked with the Ada County communities and local governments to

develop an *Air Quality Improvement Plan* in the late 1980's. In the time since, air quality in the Treasure Valley has improved significantly. No violations of the federal air quality standards have been measured since 1991. This is primarily due to successful control programs that have focused on reducing pollution from automobiles and wood burning. However, the mild winter weather in recent years has also played a role.

While improvements have been made, changes in pollution sources, new federal regulations on air pollution, and widespread growth create new challenges for the community. The Treasure Valley may have reached the limit of air pollution that can be absorbed and dissipated. Without aggressive air quality management and planning, continued good air quality could be at risk.

Air Pollution: What Is It? What Problems Does It Cause?

There are six air pollutants for which the EPA has established standards to protect the health and welfare of people, plants, and animals, as well as to prevent damage to buildings, monuments, water resources, and natural areas. These standards are based on current scientific data and studies, and are designed to protect the most sensitive populations. Those most likely to be affected by air pollution include the elderly, children, and people with existing respiratory problems. It also includes active, healthy adults who work or exercise outdoors. The standards are revised every five years to reflect new studies and scientific data on health impacts.

Major Pollutants and Effects

Carbon Monoxide

Carbon monoxide is a colorless, odorless, gas. It interferes with the ability of blood to transport oxygen to organs and tissue throughout the body. This can cause slower reflexes, confusion, and drowsiness. It can also reduce visual perception and coordination, and decrease the ability to learn.

Carbon monoxide is produced by burning fossil fuels such as gasoline, diesel, natural gas, fuel oil, or coal, especially when combustion is incomplete. Wood burning, agricultural burning, industrial combustion and forest fires also produce carbon monoxide. Carbon monoxide levels are generally highest in areas with traffic congestion and poor air circulation (like a busy downtown street with tall buildings during rush hour).

Particulate Matter

Particulate matter is made up of small particles suspended in air. The human body's respiratory system can not filter out particles smaller than 10 microns. These particles (PM₁₀) can reach deep into lung tissue, causing increased respiratory disease, lung damage, and possibly premature death. They can aggravate existing respiratory or cardiovascular disease and impair the body's defense system, causing greater susceptibility

to disease. Some particles are carcinogenic. There is also a strong correlation between PM₁₀ levels and infant mortality.

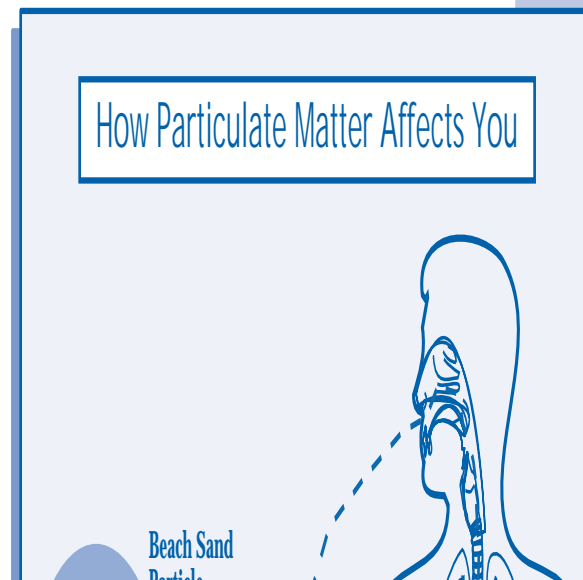
Another category of particulate matter is PM_{2.5}, particles of 2.5 microns or less. While PM₁₀ has serious health implications, the particles that make up this smaller size range have been found to be most damaging.

In 1997, the EPA slightly relaxed the PM₁₀ standards and added new, stringent PM_{2.5} standards to reflect new health studies.

Particulate matter is composed of several substances. The largest portion consists of soil or dust that becomes airborne due to vehicles, wind, construction or agricultural activities. It also comes from burning fossil fuels (e.g., gasoline, diesel, natural gas, fuel oil, and coal), smoke

Large airborne particles are filtered out by the body's natural defenses. Because of their smaller size, PM₁₀ particles are able to penetrate deep into the lungs, causing damage to fragile tissue.

PM_{2.5} particles move even deeper into the respiratory tract.



Economists estimate unhealthy air costs billions of dollars every year in health care and lost work time.

“Clean Cars Clean Air”, Consumer Federation of America, reprinted by EPA

or ash from wood burning, agricultural burning, or forest fires. Ammonium nitrate and ammonium sulfate are extremely fine particles which result from chemical reactions in the air. These particles are made up of ammonia from livestock operations and oxides of nitrogen and sulfur from burning of fossil fuels.

Nitrogen Oxides

Nitrogen dioxide is a corrosive gas which appears yellowish or brownish depending on the concentration. Nitrogen dioxide can cause respiratory illness and increase breathing difficulty. The EPA has established standards for nitrogen dioxide, but most other oxides of nitrogen (NO_x) can also contribute to air pollution problems. When NO_x combines with volatile organic compounds and warm temperatures, it is part of the chemical reaction that produces ozone. Mixed with moisture in the atmosphere, NO_x can create acid rain, which can harm humans, animals and vegetation, as well as erode buildings. United with ammonia in cold moist conditions, NO_x forms secondary particles that fit the $\text{PM}_{2.5}$ category. Secondary particles from nitrogen oxides are a significant portion of particulate matter pollution in the Treasure Valley on days with stagnant weather.

Nitrogen oxides form when fossil fuels are burned at high temperatures in motor vehicles, trains, airplanes, power plants, heating devices, and industrial activities.

Sulfur Oxides

The EPA regulates sulfur dioxide, but, like the nitrogen oxides, most oxides of sulfur (SO_x) are also of concern. Sulfur dioxide affects respiratory systems and aggravates cardiovascular disease. It can harm vegetation, including agricultural crops. Combined with ammonia, it forms secondary particles that fit into the $\text{PM}_{2.5}$ category. Mixed with moisture in the atmosphere, SO_x can create acid rain, which can harm humans, animals and vegetation, as well as erode buildings.

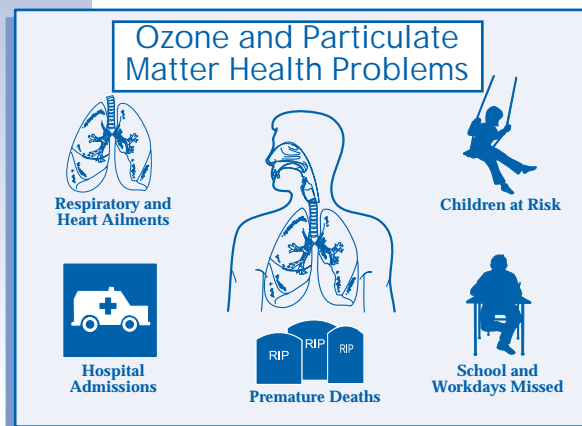
Sulfur dioxide forms when substances containing sulfur are burned; usually coal, diesel, or oil, and during some industrial processes.

Ozone

Ozone is an essential and natural part of the upper atmosphere that protects us from the sun's ultraviolet rays. Near the surface of the earth it is unnatural and causes damage. Ozone irritates the mucus membranes of the respiratory system, eyes and other tissues. Symptoms include coughing, choking, nausea, chest pain, burning or itching eyes, fatigue, and headaches. Ozone can reduce resistance to colds and pneumonia and aggravate existing respiratory conditions such as asthma, bronchitis, and emphysema. Prolonged exposure may cause permanent damage to lungs. It can also reduce the yield of agricultural crops and damage forests or other vegetation.

Generally, ozone is not emitted directly into the air. It is formed in a chemical reaction between oxygen, volatile organic compounds, and nitrogen oxides. These precursor gases come from burning fossil fuels in vehicles, factories, farm equipment or other combustion engines. They can also come from landfills, chemical solvents, and gasoline vapors.

Recent health studies have shown ozone to be even more detrimental to health than previously thought. The EPA has issued new, more stringent standards for ozone levels based on these new studies.



Airborne Lead

Lead is no longer a problem in most of the U.S., including Idaho. In the past, vehicle fuel was a major source of lead in the air. Since the advent of unleaded fuels, violation of the lead standard is rare. Violations now only occur in the vicinities of major airborne sources of lead such as smelters, battery plants, and combustion of garbage or other substances containing lead.

Toxic Air Pollutants

In addition to the six major air pollutants that are regulated, the EPA also identifies and regulates toxic or hazardous air pollution. Toxics are substances that can cause adverse health effects if a person receives enough exposure to them.

Toxic air pollutants are emitted from many sources, including motor vehicles and most chemical processes in industries or small businesses. Household cleaners and synthetic substances, such as carpeting or upholstery, may emit toxics.

Both the EPA and the state of Idaho have been regulating air toxics for a number of years. EPA's program focuses on large industrial sources and mobile sources such as vehicles. The State of Idaho's program focuses on smaller new industrial sources.

The EPA is currently expanding its focus on air toxics. It will soon complete a study on the health effects of long term exposure to toxic pollutants called the Cumulative Exposure Project. EPA is in the process of establishing an Urban Air Toxics Strategy, to address the problem of multiple toxic air pollutants in cities. EPA is expected to increase the emphasis on monitoring of air toxics in urban areas.

Other Problems from Air Pollution

Reduced visibility in the western United States is a concern. The Clean Air Act requires visibility protection for National Parks and Wilderness Areas, but has not issued guidelines for other areas. Smog and particulate matter are the main pollutants which reduce visibility.

Regional haze itself does not impair health, although the pollutant causing the reduced visibility may have health implications. However, there are indirect economic impacts associated with haze. People perceive haze as the most obvious indication that there is an air pollution problem. In a 1997 Air Quality Public Opinion Survey, 43% of Treasure Valley residents thought visibility was the best indicator of air quality. The scenic image of Idaho could be harmed if smog and haze become common. Since tourism and travel is Idaho's third largest industry, clean air is important to the state's economy.

Air pollution can have a negative impact on agricultural crops and natural vegetation. Studies have shown that increased levels of ozone, nitrogen oxides, sulfur dioxide, ammonia and other pollutants can cause damage to crops and trees, and reduce crop yields. Livestock are also susceptible to the effects of air pollution. According to an EPA fact sheet, ozone causes \$500 million in crop damage nationwide every year.

Acid rain occurs when pollution such as sulfur dioxide or nitrogen oxides mix with moisture in the atmosphere and increase the acidity of normal precipitation. Acid rain or snow can injure vegetation and crops, erode buildings, and damage lakes and streams. In extreme cases bodies of water become so acidic that fish and other organisms are unable to survive. Currently acid rain is not a concern in Idaho.

Children are especially vulnerable to ozone's harmful effects, as are adults with existing disease. But, even otherwise healthy individuals may experience impaired health from breathing ozone-polluted air.

EPA 400-F-92-006

Air Quality Monitoring in the Treasure Valley

Air quality is monitored in the Treasure Valley to characterize regional air quality and for comparison with state and federal standards. DEQ follows federal guidelines to determine which pollutants could be of concern and evaluates sources of air pollution and data from areas with comparable populations, economic bases, and emissions sources. Pollutants of concern in these areas are investigated locally. Monitoring every pollutant in every area of Idaho is not possible because of limited resources.

Pollutants Measured in this Area

DEQ has monitored particulate matter in Ada County since 1986 and in Canyon County since 1993. In recent years, Ada County has had five PM₁₀ monitoring sites: three within the City of Boise, one in Meridian, and one in southern Ada County to measure background levels. Canyon County has had one site in downtown Nampa. With the new requirements to measure PM_{2.5}, DEQ is expanding the PM monitoring network to include a second site in Nampa and one in Caldwell. DEQ is also relocating some existing sites to provide better coverage of the valley.

Carbon monoxide has been monitored in the area since the 1970's. It is currently measured at one site in downtown Boise. Studies have shown that this site regularly reflects the highest levels of carbon monoxide in the area.

The EPA requires all urban areas with a population of 200,000 or greater to monitor for ozone. The City of Boise is projected to reach this number around the year 2000, and ozone monitoring is planned shortly thereafter. Nitrogen dioxide, one of the ingredients necessary for the formation of ozone, has been monitored in downtown Boise since 1996.

Factors Which Influence Treasure Valley's Air Quality

An airshed is an area covered by a volume of air, separated from other

volumes of air by weather patterns or topography (hills and valleys). The Treasure Valley airshed is part of a large shallow basin that stretches lengthwise to the east and west. On the north side, the Boise Front, a mountain range approximately 6,000 feet high, creates a barrier to air flow. Air is further prevented from moving by the Owyhee Range to the south, and by the small benches created by the Boise River. Air in this basin can become stagnant, and does not mix readily with air in other areas. This means that pollution can build up in the basin until winds or heating causes the air in the basin to be flushed out with cleaner air.

Weather patterns have a tremendous impact on the build up of pollution in the Treasure Valley. During normal weather patterns, air near the ground heats up during the day. Hot air is lighter, causing it to rise. Cooler air rushes in to take its place near the ground. This constant circulation mixes polluted ground level air with cleaner air aloft and helps to flush out pollution.

During an inversion or stagnation episode, air is trapped in the basin. Stagnation occurs when heavy, cold air is trapped near the ground beneath warmer, lighter air. This is a very stable state that suppresses air movement. Emissions, instead of being flushed out of the area, build up over several days, and concentrations increase. These events can occur year-round, but are most common in the winter months.

An inversion is like putting a lid on a pot of boiling water ...suddenly all the steam has nowhere to go. It is trapped inside the pot.

Pollution in the valley is like steam. It gets trapped under a lid of warm air.

Summer inversions also occur, particularly during late summer and early fall, coinciding with wildfires and field burning. During these periods hazy conditions are observed. No violations of public health standards have been measured during the summer, although there is concern that there may be higher levels of ozone or PM_{2.5} during these times. DEQ will know more about the impact of summer inversions on air quality when data on ozone and PM_{2.5} is collected.

An examination of meteorological data from the last four decades

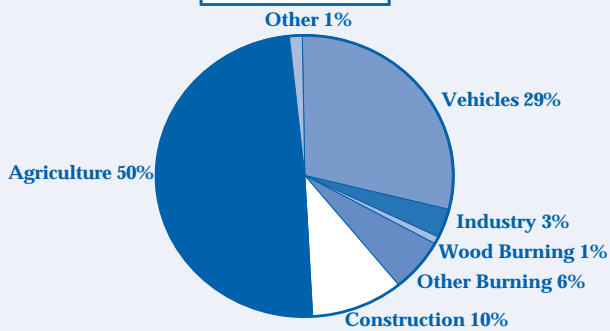
found that stagnation weather is common but unpredictable. Minor stagnation events that last five to seven days occur nearly every year. Serious winter stagnation events of seven days or more occur about once in five years. It is during these serious winter stagnation events that the area is most likely to see high levels of pollution. The last serious winter stagnation occurred in early January of 1991. During this episode, exceedances of both the PM₁₀ and carbon monoxide air quality standards were measured.

Local Sources of Air Pollution

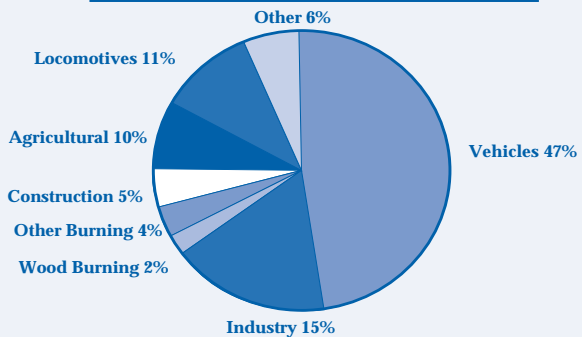
In the past, poor air quality could generally be attributed to pollution from one or two dominant sources which accumulated at ground level due to an inversion. Winter particulate matter was primarily due to wood burning and road dust. Winter carbon monoxide episodes were primarily due to automobile exhaust. Because there were one or two dominant sources, these pollution problems had straightforward solutions. Now there are a variety of sources responsible for particulate matter and ozone. The dominant sources change with the seasons. The time when air quality problems could be solved by focusing on one or two dominant sources is past. Managing air pollution is becoming increasingly complex.

Treasure Valley Emission Sources—1995

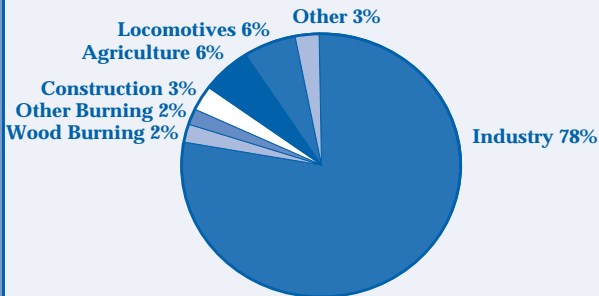
PM₁₀



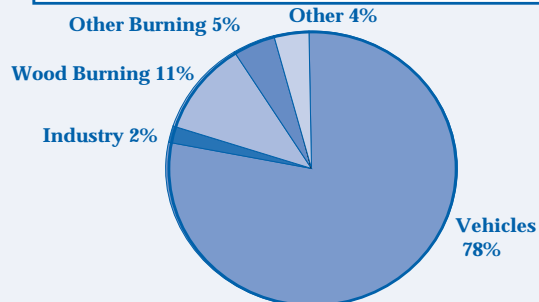
Nitrogen Oxides



Sulfur Oxides



Carbon Monoxide 1993 (Ada County Only)



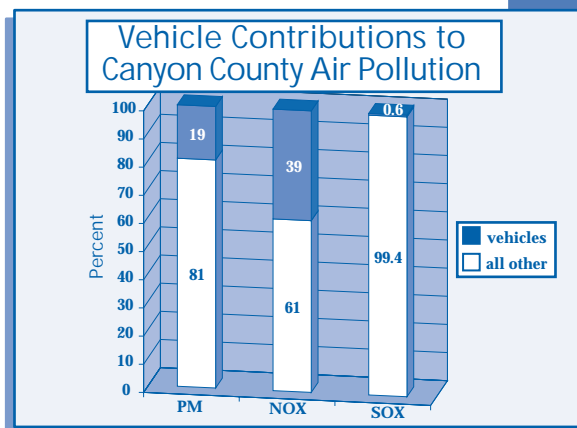
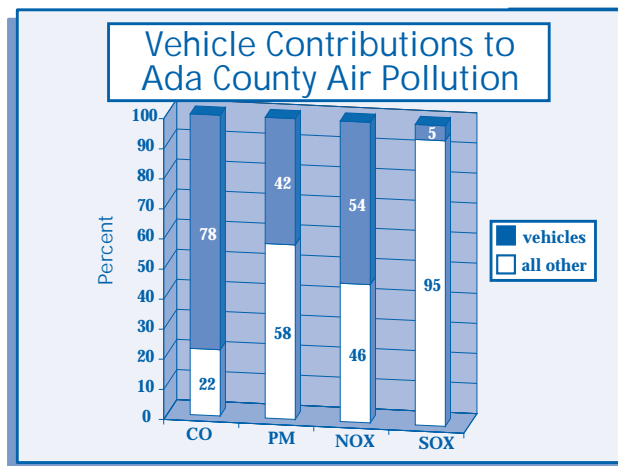
Automobiles

Vehicles are the primary source of nitrogen oxides and carbon monoxide in the area. They are also a major source of particulate matter. Vehicle exhaust contains these plus small amounts of sulfur oxides and volatile organic compounds.

Vehicles contribute particulate matter pollution from exhaust and through the creation of fugitive road dust. Vehicle tires pulverize dirt and dust on the roadway into tiny particles that are then blown into the air by passing cars and trucks. Brake dust and tire rubber also accumulate and are blown into the air. Fugitive road dust is on the increase, in direct proportion to increased vehicle use.

Cars are also a source of volatile organic compounds from gasoline vapors. Gasoline vapors can escape from the engine or gas tank when vehicles are being fueled, or when gasoline is spilled. Some hydrocarbons or volatile organic compounds are carcinogenic or toxic. These volatile organic compounds contribute to the formation of ozone.

National trends show that people are driving more than they used to. The Treasure Valley is no exception. It is projected that between 1995 and 2015 the population in Ada County will grow by 50%, but the number of miles traveled will increase by 75%. The average



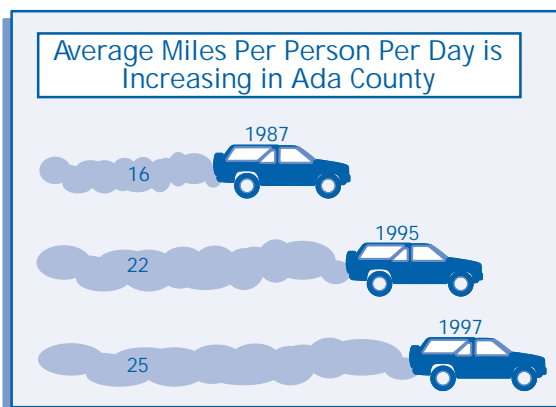
number of miles each resident of Ada County drives each day has increased from 16 in 1987 to 25 in 1997.

The increase in driving results directly in an increase in automobile emissions. Even as new regulations require cleaner burning engines, increased use of vehicles overwhelms these gains. In addition, there is a trend toward use of larger, less fuel-efficient trucks, sport utility vehicles and minivans.

The increase of two income families over the last several decades is a large factor driving the increase in automobile use. In addition, population and economic growth in outlying communities has resulted in more commuting. The rising cost of property in Boise has added to the trend to live outside Boise and

“It’s not just more people. People are driving more. People are driving longer.”

Ali Bonakdar, Ada Planning Association



commute to and from the city.

Although the effects of vehicle emissions influence the entire Treasure Valley, only Ada County residents are currently required to have their vehicles tested. If high levels of pollution are measured in the future, everyone in the Treasure Valley may be required to test their cars.

Residents of Ada and Canyon Counties have differing perceptions of the impact automobiles have on air quality. In a 1997 survey, 48% of Ada County residents identified automobiles as the largest contributor to air quality problems, as opposed to 22% of Canyon County residents.

Woodburning

Residential wood burning has historically been a primary source of both particulate matter and carbon monoxide pollutants. The Air Quality Advisory program, which began in the 1980's, was enhanced in 1991. This program strives to reduce pollution from wood burning by providing financial incentives to purchase newer, clean burning wood stoves. An ongoing public information campaign has advised the public about alternatives to wood heat, and offered financial incentives to convert to electricity or gas. The program also works to reduce wood burning emissions when pollution levels are high. When concentrations reach "trigger"

levels, voluntary or mandatory wood burning bans are issued.

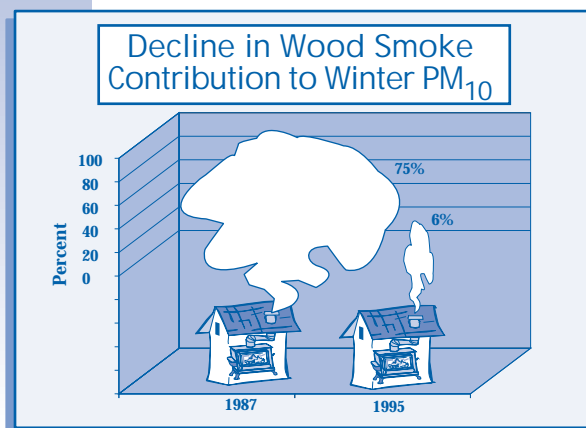
The program has been extremely effective. In 1987, up to 60% of households used a wood burning device regularly and wood burning was responsible for 76% of the particulate emissions. By 1995 only about 30% of the households burned regularly. DEQ research also found that by 1995, residential wood combustion accounted for less than 6% of particulate matter in Ada County on average winter days.

Agriculture

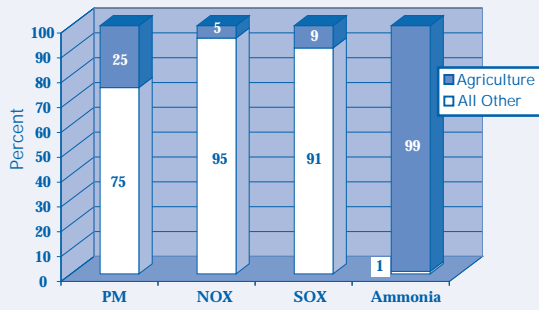
Fugitive dust enters the air from agricultural fields that are being tilled or have no crop cover. Agricultural burning is a source of organic carbon and elemental carbon particles. The impact of agricultural activities on air quality has not been studied in the Treasure Valley. Air pollution was viewed as a winter problem and very few agricultural activities occur during the winter. Recent increases in late summer and early fall pollution levels bring agricultural particulate matter emissions into consideration.

Current Idaho legislation states that agricultural burning cannot be regulated unless pollution levels exceed federal health standards. A new Memorandum of Understanding has been developed between the Idaho Department of Agriculture, DEQ, and Idaho farming associations. This agreement is designed to reduce the impact of agricultural burning, and will create a program that encourages good burning practices and allows for voluntary training of field burners.

Initial studies show that animal urine from livestock operations accounts for 99% of ammonia in the Treasure Valley airshed. Ammonia, reacting in the air with other chemicals, creates very fine particulate matter. Recent studies indicate that a large percentage of total particu



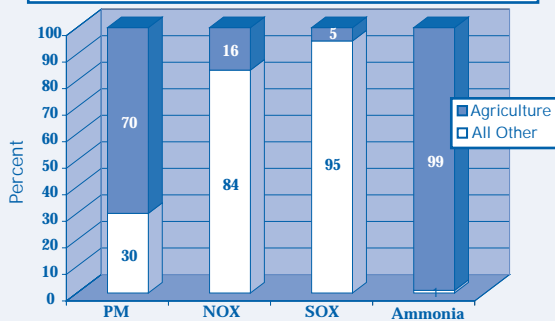
Agricultural Contributions to Ada County Air Pollution



gen oxides in the area. Surveys show that 30% of Canyon County residents perceive factories as the biggest source of air pollution.

State and federal regulations control pollution from industrial facilities. The requirements are stricter in nonattainment areas like Ada County. For larger facilities, DEQ issues air pollution permits that set specific limits on the amount of pollution the company is allowed to release to the air.

Agricultural Contributions to Canyon County Air Pollution



DEQ makes every effort to provide maximum operational flexibility to industrial facilities. The emissions allowed by the permit are based on the largest amount the facility could emit without violating federal air quality standards at the property boundary. Some facilities may request a permit to emit less pollution to avoid additional

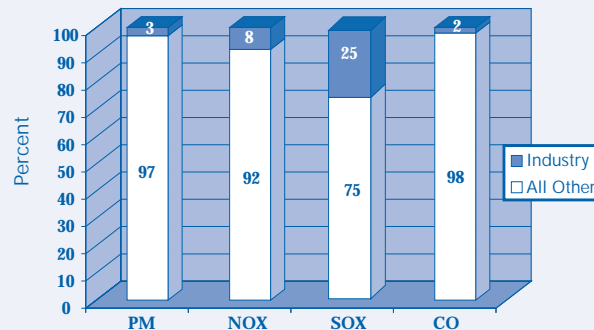
late matter is made up of fine particles under stagnant weather conditions.

Agricultural emissions are forecasted to be static because additional acreage for agricultural use within the Treasure Valley is limited. Canyon County has approximately six times more agricultural land than Ada County, so the relative contribution of agriculture to air pollution is higher in Canyon County.

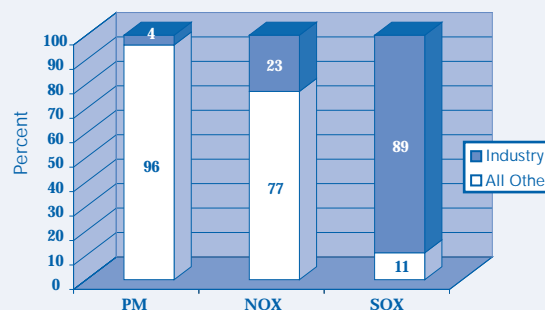
Industry

For some pollutants the emissions from industries are a small component of the total emissions for the Treasure Valley airshed. Industries contribute only 2% of the area's carbon monoxide and 3% of the area's total particulate matter. Industry has a larger impact on other pollutants. Industry is the largest source of sulfur oxides and the second largest source of nitro-

Industry Contributions to Ada County Air Pollution



Industry Contributions to Canyon County Air Pollution



regulations that apply to larger facilities. Permits frequently allow emissions that are much higher than the facility currently emits, in order to provide maximum operational flexibility. Whether the facility will ever emit the total amount allowed by their permit depends on economic factors.

Many smaller facilities are not required to have an air pollution permit. This is also true for some older sources that have been excluded from newer regulations. In other cases, an air pollution permit may be required for only part of a facility's operation. For these unpermitted industrial sources, it is possible for all or part of the facility to operate without emission controls or limits.

Although industries may never emit the maximum amount allowed by their permits, DEQ must consider the impact to air quality if industrial emissions increase, as the current rules allow. Both Ada and Canyon Counties anticipate continued growth in industry related jobs, an increase of as much as 86% by the year 2015. DEQ will continue to manage pollution from industrial facilities to ensure future compliance with air quality standards.

Prescribed Burning on Federally Managed Lands

Smoke from wildland fires is a source of particulate matter and carbon monoxide. In the past, most forest fires were wildfires. Emissions from these fires could not be controlled.

Now the federal and state land managers attempt to manage forest and range fires. Small prescribed fires remove burnable materials from the forest before they build up. All prescribed burning in the Northwest occurs over a short period in the fall and spring when conditions are safe. Because the

prescribed burns for the entire region occur at the same time, there is potential for particulate levels and haziness to increase in areas near the burns.

The Forest Service analyzes air quality and weather patterns before igniting any prescribed burns. However, weather patterns can change suddenly, and smoke levels can temporarily increase. This was the case in April 1998 when winds shifted, blowing smoke over the Boise area. Monitoring data from April 28th shows particulate matter was elevated, reaching hourly concentrations up to 191 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) in the early morning hours. However, the smoke was in high concentration for only a short period before the sun's warmth helped mix the air and dissipate the smoke. The 24-hour average on this day was only about $50 \mu\text{g}/\text{m}^3$. The National Ambient Air Quality Standards are set at $150 \mu\text{g}/\text{m}^3$ for 24 hours. There are no standards set for shorter periods.

Careful management is necessary to protect air quality and avoid regional haze. The U.S. Forest Service, Bureau of Land Management, and other local land management agencies are developing a smoke management program. The program will establish a coordinating agency to manage prescribed burns. This agency will analyze weather and other factors that impact smoke accumulation, and issue daily burn restrictions for program participants.

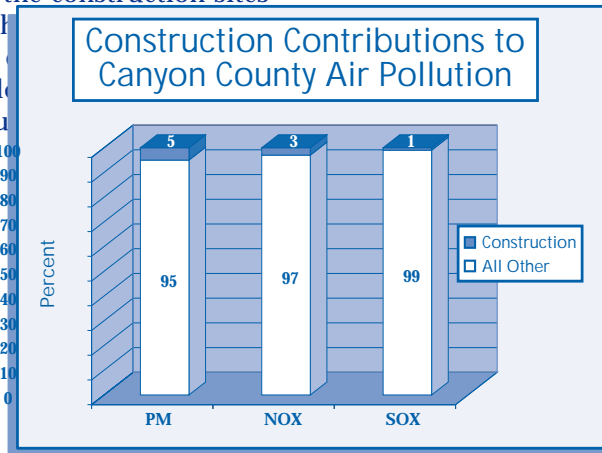
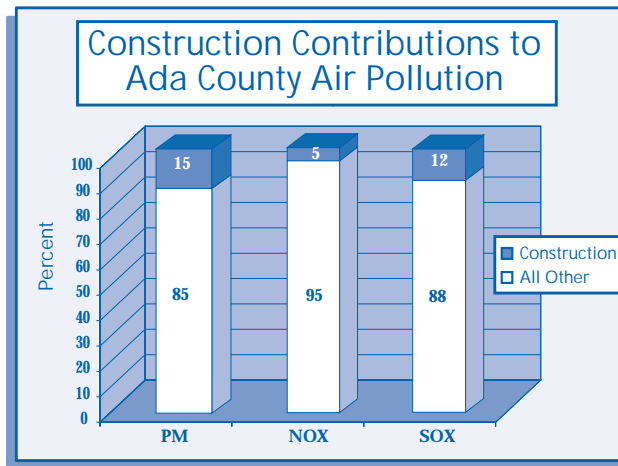
Construction

Dust generated by construction equipment is the third largest source of particulate matter in the Treasure Valley. Construction equipment also generates carbon monoxide, nitrogen oxides and sulfur oxides emissions.

Ada County and the City of Boise are both considering ordinances that

would help reduce the effects of dust near construction sites. These ordinances are expected to substantially reduce the amount of dust due to construction activities and to limit the amount of material tracked out onto roadways at construction sites. If airborne dust generated at construction sites was reduced by only half, the effect would be to lower total particulate levels in Ada County by 7% or more annually. The Treasure Valley would see a reduction of almost 5% annually. Effects on particulate levels close to the construction sites

would be much less. The amount of dust on roadways could decrease the further



Air Quality Trends

There have been significant improvements in the Treasure Valley's air quality since the early 1970's. During the 1970's exceedances of health-based air quality standards were recorded between sixty and eighty days each year, mainly for carbon monoxide. A significant number of PM exceedances were also noted. Now exceedances for either pollutant are rare. No air quality health violations have been measured since 1991.

While major improvements have been made in the Treasure Valley, the area faces new obstacles in maintaining air quality. Recent studies on the health impacts of air pollution have led to new, more stringent federal regulations. Although pollution reduction programs have been effective, the amount of air pollution generated each day continues to increase as the valley grows. The increased emissions, the new federal regulations, and the local weather patterns all combine to present a challenge in maintaining acceptable air quality.

Particulate Matter

Peak 24-hour and annual average PM₁₀ levels in Ada County have significantly declined since measurement began in the mid-1980's. Because of historically high levels of PM₁₀, the EPA designated northern Ada County a PM₁₀ nonattainment area and required the State of Idaho to develop an *Air Quality Improvement Plan* to fix the problem. Measures such as the Air Quality Advisory Wood Burning Curtailment Program and aggressive

road sweeping policies have been very successful at reducing airborne particulate matter during the winter stagnation events. Since 1986, there has been a declining trend in the annual average PM₁₀ levels. Ada County has not violated the federal 24-hour standard since January 1991, the last severe stagnation event. However, there have not been any serious weather stagnations in recent years.

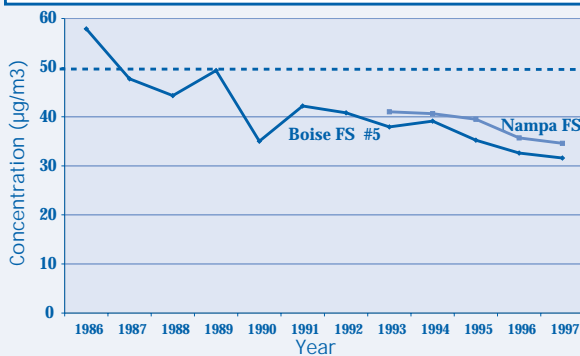
DEQ began measuring PM₁₀ in Canyon County in 1993. While there have been no measured violations, the annual average concentration in Canyon County has been slightly higher than in Ada County. The highest concentration measured in the Treasure Valley in recent years was measured at the downtown Nampa site in August 1996. DEQ plans to add monitoring sites in Canyon County to better track levels of particulate matter.

PM Outlook

In July 1997, EPA established new particulate matter standards. Based on recent studies on the health impacts of air pollution, the new standards alter the way PM₁₀ violations are calculated and add a new standards for smaller particulate matter, PM_{2.5}.

DEQ has requested that the EPA allow early adoption of the new standards and reclassify the region to a PM₁₀ attainment area. The change in status would allow the Idaho Division of Environmental Quality to focus its attention on the more protective PM_{2.5} standards. It also eliminates some of the requirements imposed on nonattainment areas—like conformity require

Average Annual PM₁₀ Concentrations for Boise and Nampa



ments and the requirement to develop an *Air Quality Maintenance Plan*.

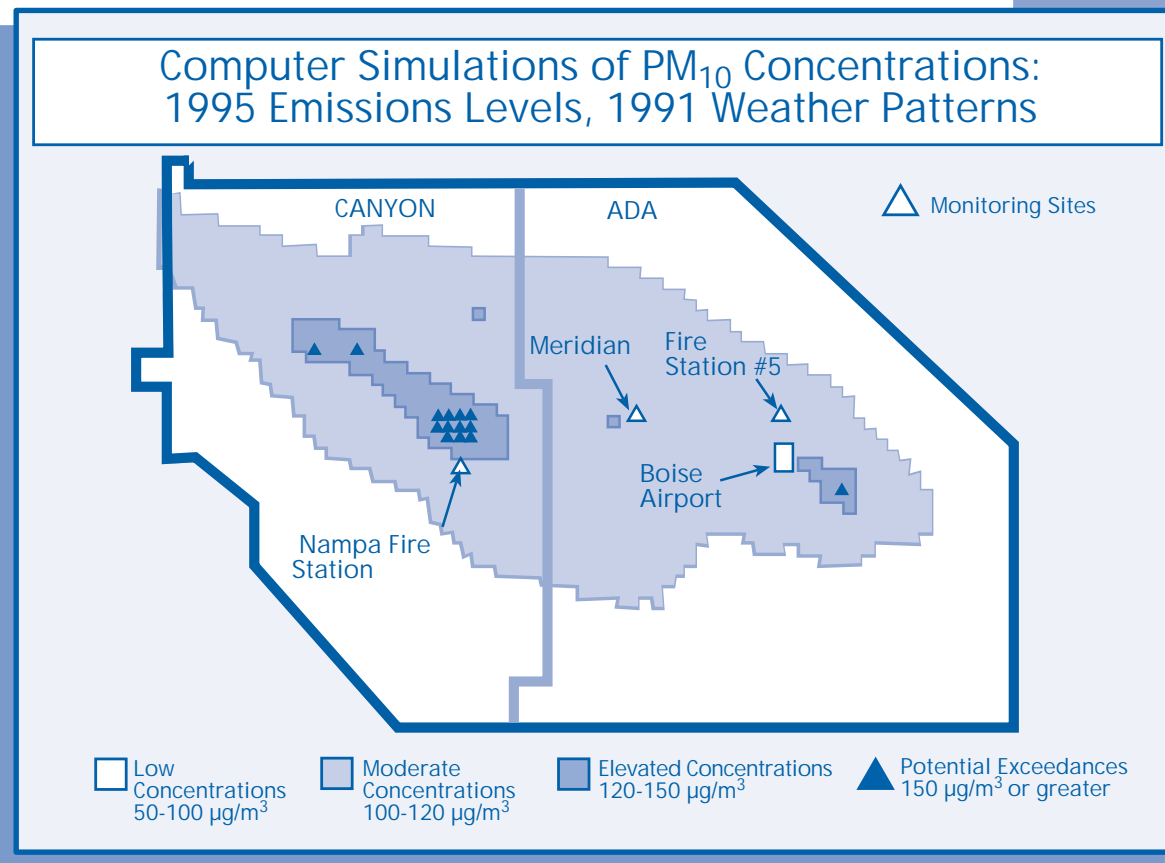
Even with the adoption of the new, less restrictive PM_{10} standards and the declines in winter wood burning, the area still faces challenges managing particulate pollution. One of the primary challenges will be meeting the new federal regulations established for $PM_{2.5}$. These regulations are expected to pose a big challenge to urban areas across the country. Many regions, including the Treasure Valley foresee difficulty meeting this requirement. There are several reasons this is anticipated to be difficult.

First, the annual standards for $PM_{2.5}$ are very restrictive. These low standards are based on studies on the health impacts of particulate matter. Although DEQ does not anticipate difficulty meeting the standards for 24 hour average concentrations, the annual standards may prove to be more of a challenge

Second, there is some indication that local $PM_{2.5}$ levels may be high at

times. DEQ is just beginning to measure $PM_{2.5}$ so it is uncertain what the levels are currently. However, a recent “chemical fingerprinting” study of particulate matter found that up to 50% of the PM_{10} on the most polluted winter days is composed of ammonia, sulfur oxides, and nitrogen oxides. This type of particulate matter fits into the 2.5 category. The study of how these small particulates form from other pollutants in the Treasure Valley is just beginning.

Because the area’s original *Air Quality Improvement Plan for Particulate Matter* was developed in the late 1980’s, a study was conducted recently to update the *Plan*. A computer simulation was performed using regulatory models approved by the EPA. The models projected what the air quality would be like if an inversion similar to the 1991 inversion occurred. The computer simulations estimated that if such a stagnation occurred, exceedances of the air quality standards would occur, even at 1995 emissions levels. The computer projected exceedances in Nampa and



southeast Boise. After 2005, fugitive dust from motor vehicles was estimated to result in widespread pollution exceedances.

While these numbers are based on worst case assumptions, they show a need for continued concern. How these predicted exceedances might factor into violations of the new standards is being investigated by DEQ.

Fugitive road dust is predicted to be the fastest growing year round source of particulate matter. During the worst stagnation events roads are usually wet, so fugitive road dust has not historically been a problem during these times. However, it may be a factor in the increasing pollution levels during the late summer and early fall. Further study of fugitive road dust is needed. DEQ also needs to determine how much of the road dust in the air is in the PM_{2.5} size category.

One strategy being used to reduce road dust is an aggressive road sweeping program which removes sand after winter storms. Another technique being used is to avoid sanding altogether by applying de-icing materials to roads before storms to prevent ice buildup from occurring. A third strategy, employed on I-84, is to use road sand that contains fewer small particles and can withstand deterioration from traffic. However, these mea-

asures will not keep up with the increase in vehicle use, and have no impact on summer particulate levels. One program which could significantly reduce dirt on the roads are the proposed ordinances to reduce dust tracked onto roads at construction sites.

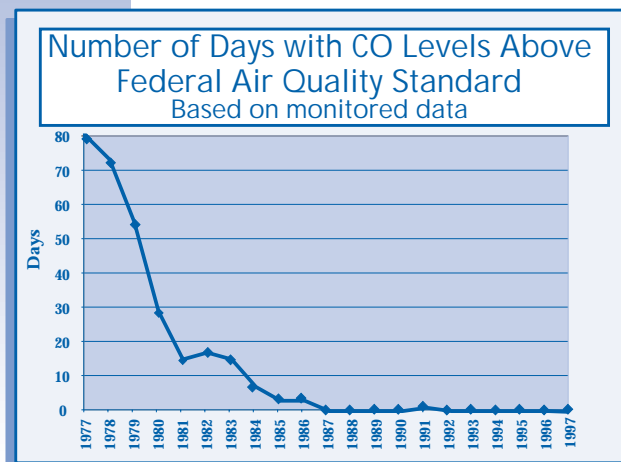
Currently, industry is not a major source of particulate matter, accounting for only 3% of annual particulate matter emissions. However, computer simulations projected elevated particulate concentrations near some industrial sources under certain weather conditions. In addition, DEQ's current permitting rules allow industry the flexibility to increase emissions significantly. These factors combined create the possibility that industrial emissions of particulate matter could have a greater impact on air quality in the future.

Carbon Monoxide

Ada County was designated a nonattainment area for carbon monoxide in 1977 because violations of the standard were measured. Carbon monoxide levels have since dropped. Only one exceedance has been measured in Ada County since 1987. However, there is concern that levels could rise due to increasing total emissions.

The largest source of carbon monoxide has been, and continues to be, motor vehicle tailpipe emissions. Federal vehicle emissions standards have radically decreased carbon monoxide tailpipe emissions since the mid 1970's. The Ada County Vehicle Inspection and Maintenance Program further reduced carbon monoxide emissions. Improvements in traffic flow in downtown Boise have also reduced congestion and eliminated opportunities for pollution to build up in "hot spot" areas. As a result, carbon monoxide levels have improved in the area.

There is no permanent carbon monoxide monitor in Canyon County. A



short term winter monitoring study conducted in downtown Nampa in 1995-96 found carbon monoxide levels which are well below national standards and similar to levels in downtown Boise.

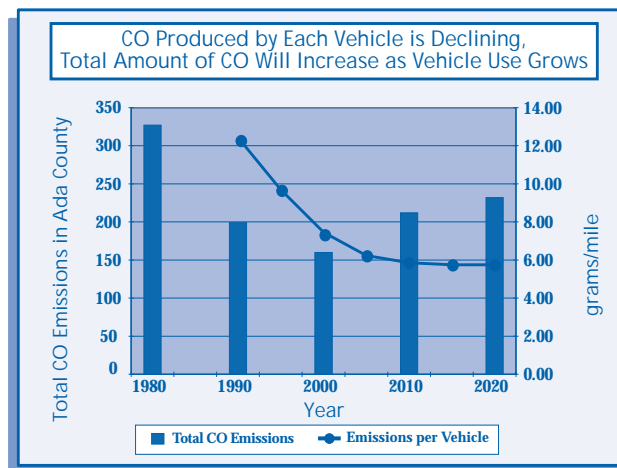
CO Outlook

Ada County's *Air Quality Improvement Plan* addressing the carbon monoxide problem has been approved by the EPA. Since there have been no violations of the standard in recent years, DEQ is currently working with local governments in Ada County to develop a *Maintenance Plan* for carbon monoxide. The *Maintenance Plan* will detail strategies for continued compliance with the standard over the next twenty years. Approval of a *Maintenance Plan* for Ada County will allow the area to be redesignated to a maintenance area. This is the first step towards redesignation to attainment.

One of the challenges that must be addressed in the *Maintenance Plan* is increasing motor vehicle use. It has been estimated that on or before the year 2000 the sheer amount of pollution generated from motor vehicles will reverse the downward trend in carbon monoxide emissions. The analysis for the *Maintenance Plan* is expected to show the need for new strategies to offset pollution from increased automobile use and new industrial sources in Ada County.

If future violations are measured, the entire Treasure Valley may be declared nonattainment. If this occurs, residents of both Ada and Canyon Counties would be required to test their vehicles for emissions.

As one step toward preventing future exceedances, an enhanced vehicle testing program will lower the carbon monoxide pollution limits for cars and trucks in Ada County in the year 2000. Canyon County officials are also looking at implementing a testing program. A



pilot project conducted in September 1998 showed a high level of public interest in the program.

Other sources of carbon monoxide which are expected to increase in the near future include the Boise Air Terminal and industrial facilities in Ada County. The *Maintenance Plan* will consider and address these growing sources of carbon monoxide pollution.

Nitrogen Oxides

Recent monitoring of nitrogen dioxide in Ada County shows concentrations well below the federal health standard of 0.053 parts per million. However, nitrogen oxides are a component of two other pollutants that could be of concern. Nitrogen oxides contribute to the formation of ozone during summer months. During stagnation events in the winter, it is also a significant contributor to particulate matter. In the atmosphere, nitrogen oxides can form secondary particulates that fit into the PM_{2.5} category.

Vehicles emit 54% of the nitrogen oxides in Ada County. Since vehicle use is rising, the amount of nitrogen oxides being emitted will also rise. To counteract this trend, beginning in 2000 the Ada County Vehicle Inspection and Maintenance Program will begin to test for oxides of nitrogen.

Looking Forward

If No Action Is Taken . . .

If air quality in the Treasure Valley is not managed properly, it will deteriorate, become an increasing public health threat, and require more stringent regulations.

Without controls to offset increases in pollution, monitored levels of carbon monoxide are projected to exceed the health standard sometime after the year 2000. If a stagnation event occurs, we could experience a violation even sooner. Northern Ada County would remain a nonattainment area for carbon monoxide. Canyon County might also be declared a nonattainment area.

While PM₁₀ pollution appears to have been addressed, levels of PM_{2.5} are unknown. Recent computer simulations of air quality indicate that the next major inversion may result in elevated levels of particulate pollution. In addition, year round particulate pollution is a concern and little is known about the sources that result in elevated pollution during the summer and fall.

Ozone monitoring is scheduled to begin sometime after the year 2000. All of the elements which typically result in high ozone levels (pollution from cars combined with long, sunny, stagnant summer days) are present in the Treasure Valley. If high levels are measured, the entire valley could be designated a nonattainment area for ozone.

In addition to health concerns, there are other negative effects of increased air pollution and nonattainment designations. Federal funding for transportation improvements may be blocked. Increasingly stringent permit regulations might become necessary, driving up production costs and discouraging incoming business. Existing industries would also need to continue to meet strict requirements. Companies investigating the area to resettle or expand

in might be discouraged from locating here.

In other areas of the country with pollution problems, nearly every source of air pollution is regulated. Small businesses such as bakeries, dry cleaners, printers, gas stations, and auto body shops are subject to more restrictive rules. Sources such as lawn mowers, barbecues, motorcycles, and boats are also regulated. These areas develop an image of an unhealthy, polluted place to live.

In the Treasure Valley, increased pollution could reduce agricultural yield, affecting the economic base of many local towns. Everyday activities might be restricted. Wood burning might be outlawed altogether. Trip reduction ordinances might be enacted to require employers to reduce commuting. Vehicle emissions controls could be increased.

The effect of ignoring air quality issues could be severe.

But, if we plan . . .

On the other hand, if we plan ahead and continue to take positive steps in managing air pollution, we can avoid these drastic outcomes. We will have cleaner air and a healthier environment.

Although past programs to protect the valley's air quality have been effective, they may not be adequate in the future. Just as pollution sources change, strategies to control their impact must also change. Without proactive planning and continued analysis, air pollution may increase to the point where stricter controls are needed.

Individuals and their communities can take actions now to minimize air pollution and prevent future problems.

Community Actions

The direction each community takes can affect the quality of air in the entire Treasure Valley. Communities can take positive steps to improve air quality in their local area and the entire valley.

- ❖ Commit to educating the public about the hazards, sources, and solutions of air pollution. Inform individuals on steps they can take to reduce their contribution.
- ❖ Work with DEQ to install air quality monitoring devices in your community to track air quality conditions.
- ❖ Plan for growth and develop strategies to reduce urban sprawl and personal vehicle use.
- ❖ Initiate ordinances and policies that help reduce airborne pollution, including vehicle inspection programs, construction dust ordinances, bans on open burning, and clean road sweeping and sanding policies.
- ❖ Provide employees options that help to reduce work trips, such as providing bus passes, preferential parking for carpoolers, work at home options, or flexible hours. Issue discounts or awards to employees who reduce trips to work. Avoid extra trips made at lunch time by arranging to have food delivered. Encourage other employers to follow your lead.
- ❖ Promote and support alternative modes of transportation. Incorporate these ideas into city planning.
 - Provide safe sidewalks, bike routes, and bike storage.
 - Give buses and car pools preferential treatment by creating special lanes.

- Establish a region wide public transportation system.
- Develop park-and-ride lots.

- ❖ Improve intersections and synchronize traffic lights to reduce idle time.
- ❖ Establish or enhance vehicle inspection and maintenance programs.

Personal Actions

We all help create air pollution, and we can all do our share to prevent it. Here are some ways **you** can make a difference:

Drive Less

The most effective way to reduce emissions from your vehicle is to use it less.

- ❖ Riding the bus, carpooling, and sharing trips will all reduce the number of cars emitting pollutants. If possible, choose non-polluting travel, such as walking or biking.
- ❖ Reduce commuting. Choose to live close to your work.
- ❖ Organize a carpool at your work. Call 345-POOL for help.
- ❖ Combine trips to the same areas. Once you arrive, park your car and walk between destinations.
- ❖ Avoid driving during peak traffic hours or stop and go traffic.

Maintain Your Car

All cars emit some pollutants - poorly maintained cars emit the most. A properly tuned car runs better, gets better gas mileage, and also pollutes less.

- ❖ Get regular tune-ups. Vehicles with worn spark plugs or clogged fuel or air filters do not run efficiently and emit more pollution.
- ❖ Keep tires properly inflated and wheels aligned to reduce tire drag on the road. Gas mileage

Pick one day a week to walk, bike, carpool, or ride the bus.

drops 1% for every pound below the recommended level.

- ❖ Don't top off the gas tank. This allows harmful chemicals to escape into the air.

Drive Wisely

The harder your engine works, the more gas it burns, and the more tailpipe emissions you create.

- ❖ Avoid carrying unneeded items. Each extra 100 pounds increases the amount of gas used by 4%.
- ❖ Place items inside the vehicle instead of on roof racks. Remove roof racks when not in use. The wind drag from a rack increases gas consumption by almost one mile per gallon.
- ❖ Drive at a medium speed. Most cars get the best gas mileage between 35 and 45 miles per hour.
- ❖ Drive at a steady speed. Avoid stop and go traffic, and take it easy on the brake and gas pedals.
- ❖ Use the air conditioner only when necessary. Air conditioners can reduce your gas mileage by 20%.
- ❖ Avoid long idles at drive up windows or when waiting. Restarting a warm engine takes less fuel than letting it run for just 30 seconds.

Avoid Using Gas Powered Hand Tools

Gas powered yard tools emit more pollution than you'd think. Operating a gas powered lawn mower for one hour produces as much pollution as driving a car for 50 miles.

- ❖ Consider replacing your mower with an old-fashioned push mower. They take very little extra time, and will increase your fitness level. Electric mowers or new, more efficient gas mowers are another alternative.

- ❖ Choose electric or hand powered yard tools such as rakes or brooms in place of leaf blowers.

Reduce Burning

Wood burning and open burning of weeds and land clearing create particulate matter, carbon monoxide, and even toxic chemicals.

- ❖ Convert from wood to gas or electric heat, or get a clean burning fireplace insert.
- ❖ Find safer ways to remove weeds or fire hazards and clear land.
- ❖ NEVER burn man made refuse - it is not only illegal, the toxic smoke created can be dangerous.
- ❖ Cooperate with air quality advisories and burn bans.

Reduce Energy Use

- ❖ Plant trees and shrubs to create wind breaks and provide shade in summer.
- ❖ Insulate doors, windows, walls, and ceilings.
- ❖ Turn off lights and appliances that aren't in use.
- ❖ Set thermostat no higher than 68° in winter, no lower than 75° in summer.
- ❖ Buy energy efficient appliances.

Further Studies and Information

In future years existing emissions control programs may not be sufficient to prevent exceedances. If air quality standards are violated in the future, DEQ will take necessary actions to resolve the problem. Currently, DEQ's role is one of supporting local efforts to maintain good air quality. DEQ plans to expand its pollution monitoring program, and to maintain existing control programs. Communities may choose to initiate or enhance programs designed to control air pollution, but will not be required to do so unless air quality deteriorates.

Studies show that vehicles are the fastest growing source of air pollution. Already Ada County has begun planning for an enhanced vehicle testing program. Canyon County is expected to begin testing cars as well.

Additional information will be necessary, especially to address new air quality challenges, such as PM_{2.5} and ozone. We need to increase our understanding of the causes and sources of air pollution. DEQ recommends further studies on the following topics:

- ❖ Particulate matter—explore the increased pollution levels during summer and fall, analyze the effects of expanding wood burning controls and road sweeping measures to encompass Canyon County, study the effects of establishing construction dust ordinances, develop more accurate local road dust emission factors, and analyze the relationship between levels of PM_{2.5} and PM₁₀.
- ❖ Secondary particulates—Studies have shown that the formation of secondary particulate matter is limited either by the amount of oxides of nitrogen or by the amount of ammonia available in the atmosphere. Future studies are necessary to determine which of these chemicals limits the formation of secondary particulates in the Treasure Valley airshed.
- ❖ Carbon monoxide—conduct an inventory of pollution sources and analyze data for potential future problems.
- ❖ Ozone—begin monitoring ozone levels in the area and study the local sources and factors that contribute to ozone production.
- ❖ Meteorology and weather patterns—determine the frequency and duration of the stagnation events and expand meteorological monitoring to track and predict weather patterns.
- ❖ Effects of expanded vehicle testing—model the predicted impact of hydrocarbon and NO_x testing beginning in Ada County in the year 2000 and model the effect of voluntary or mandatory emissions testing in Canyon County.
- ❖ Industrial Permits—review DEQ's current permitting rules which allow flexibility to increase emissions significantly. Change if appropriate.
- ❖ Pollution Trading—in this system, a certain total amount of allowable emissions for each pollutant would be set. The right to emit pollutants (emissions credits) would be allocated among the different sources of pollution. Sources could trade or sell the credits, providing flexibility in the efforts to reduce pollution. DEQ needs to study the feasibility of such a system.

More information

More information about the Treasure Valley's air quality is available. A complete bibliography of recent technical air quality studies conducted in the Treasure Valley is included in this report. If you would like a copy of these studies or if you have other questions, you can contact the DEQ's Boise Regional Office at 1445 North Orchard in Boise, Idaho or by calling (208) 373-0550.

Air Quality Glossary

Airshed An area covered by a volume of air, separated from other volumes of air by weather patterns or topography (hills and valleys).

Compliance Obeying federal or state environmental laws or policies.

Conformity The Clean Air Act requirement for nonattainment areas that federal funding and approval be given only to activities that are compatible with air quality plans. Road projects, airport activities, and other federally funded projects must meet conformity requirements.

Control Strategy Any program or technique designed to reduce air pollution, such as vehicle testing and wood burning bans.

DEQ Division of Environmental Quality; the Idaho state agency responsible for administering environmental protection laws, programs, or policies.

EPA Environmental Protection Agency; the federal agency responsible for administering environmental protection laws, programs, or policies.

Emissions Pollution released into an area.

Emissions Inventory An estimate of all air pollution emitted in an area.

Exceedances A single monitored value above the National Ambient Air Quality Standards. One or more exceedances may result in a violation.

Fugitive Road Dust Dust that is pulverized into small particles by vehicles driving over it. The minute dust is then blown into the air by passing vehicles.

Hydrocarbons A broad spectrum of organic compounds containing only carbon and hydrogen and often occurring in petroleum or natural gas.

Inversion Stagnant conditions where a layer of heavy cold air is trapped near the ground under a layer of warmer, lighter air. Absence of heating near the ground prevents the air layers from mixing, resulting in pollutants accumulating in the area.

Maximum Flexibility Permitting DEQ has a policy of maximum flexibility permitting. The emissions allowed by permit are based on the largest amount the facility could emit without violating federal air quality standards at the property boundary. Some facilities choose a permit to emit less pollution than DEQ's policy would allow in order to avoid additional regulations that apply to large facilities.

National Ambient Air Quality Standards (NAAQS) Air quality standards based on human health established by the EPA.

Nonattainment Area An area that does not meet standards for human health, as established by the Clean Air Act.

NO_x An atom of nitrogen combined with one or more atoms of oxygen. An air pollutant.

Ozone A molecule made up of three atoms of oxygen. In the upper atmosphere it forms a layer that shields the earth from harmful ultraviolet rays. However, near the ground it is a pollutant that causes health problems.

PM₁₀ Particulate matter with a diameter of 10 microns or less. (About 1/7 the width of a human hair)

PM_{2.5} Particulate matter with a diameter of 2.5 microns or less.

SIP or Air Quality Improvement Plan State Implementation Plan; when an area measures unhealthy air quality, the state must develop a plan to improve air quality and come into compliance with federal air standards.

Sources: Area Small, widespread emission points. They do not move but are too numerous to analyze individually. Examples include chimneys, agricultural tilling, construction activities, wildfires, open burning, livestock, wind erosion, natural gas, coal, propane, and fuel oil combustion.

Sources: Mobile Sources of emissions that move. Onroad mobile sources are cars and trucks. Nonroad sources include small equipment, like lawn mowers, and vehicles such as airplanes, tractors, trains, construction equipment, and boats.

Sources: Point A single, identifiable source of pollution, such as an industry.

SO_x An atom of sulfur combined with one or more atoms of oxygen. An air pollutant.

Volatile Organic Compounds Hydrocarbon compounds found in a gaseous states at typical ambient temperatures which are important in the formation of ozone.

VMT Vehicle Miles Traveled; the per capita average number of miles traveled by vehicle per day.

Bibliography

ACHD, ITD, DEQ, "Memorandum of Understanding: The Control of Particulate Matter Associated with Paved Roadways in the Northern Ada County PM₁₀ Nonattainment Area", June 1995.

APA, 1984 Air Quality Improvement Plan—Transportation Control Plan for Attaining Ambient Air Quality Standards for Carbon Monoxide in Northern Ada County, April 1984.

APA, 1993 Base Year Carbon Monoxide Emission Inventory for Northern Ada County, Idaho, January 1996. (APA CO Emissions Inventory)

APA, 1997 Demographic Report for Ada and Canyon Counties, June 1997.

APA, Air Quality Program for the Treasure Valley, March 1998.

Clearwater Research, Inc., APA, 1997 Air Quality Public Opinion Survey.

DEQ, Chemical Mass Balance Results for Boise-Nampa Area, March 1996.

DEQ, Memorandum, "Nitrate Analysis of Boise Filters", July 1991.

DEQ, PM₁₀ Dispersion Modeling for the Treasure Valley, 1999.

DEQ, Final Report: Development of Base and Future Year Emission Inventories for Industrial Sources for the Northern Ada County PM₁₀ Nonattainment Area, March 1998. (DEQ PM₁₀ Industrial Emissions Inventory)

DEQ, Northern Ada County/Boise Area and Mobile Source Emission Inventory 1987—TSP and PM₁₀, August 1990.

DEQ, Northern Ada County/Boise Particulate (PM₁₀) Air Quality Improvement Plan, October 1991.

DEQ, Summary of Air Quality Advisory Operation and local city and county wood burning ordinances.

Downs, Jerry L., Environmental Monitoring and Services, Inc., Final Report on Integrated Air Cancer Project Site Source Inventory: Boise, Idaho, December 1986.

EPA, Air Quality Trends, September 1995.

EPA, Ozone—Good Up High, Bad Nearby, EPA/451/K-97-002, October 1997.

EPA, Office of Mobile Sources, AP-42 Air Pollution Emissions Factors, 1998.

ICF Kaiser, Final Report: Development of Base and Future Year Emission Inventories for Area Sources, Nonroad Mobile Sources, and Onroad Motor Vehicles for the Northern Ada County PM₁₀ Nonattainment Area, November 1997. (ICF Kaiser PM₁₀ Area and Mobile Emissions Inventory)

Kuhns, Hampden, Mark Green, John Watson, Mike McGown, and Diane Riley, Desert Research Institute and DEQ, Analyzing Speciated Ambient PM₁₀ Concentration and Emission in Ada And Canyon Counties, Idaho, May 1998.

“Monitoring and Meteorological Data”, compiled by DEQ from EPA Aerometric Information Retrieval System, December 1997.

Riley, Diane M., Alison A. Miller, and Krishna Viswanatha, DEQ, Screening Analysis of Significant Secondary Particles, May 1998.

Wolyn, Paul, and Thomas Mckee, “Deep Stable Layer Theory and Methods for Determining Stagnation Strength”, Monthly Weather Review, March 1989.

