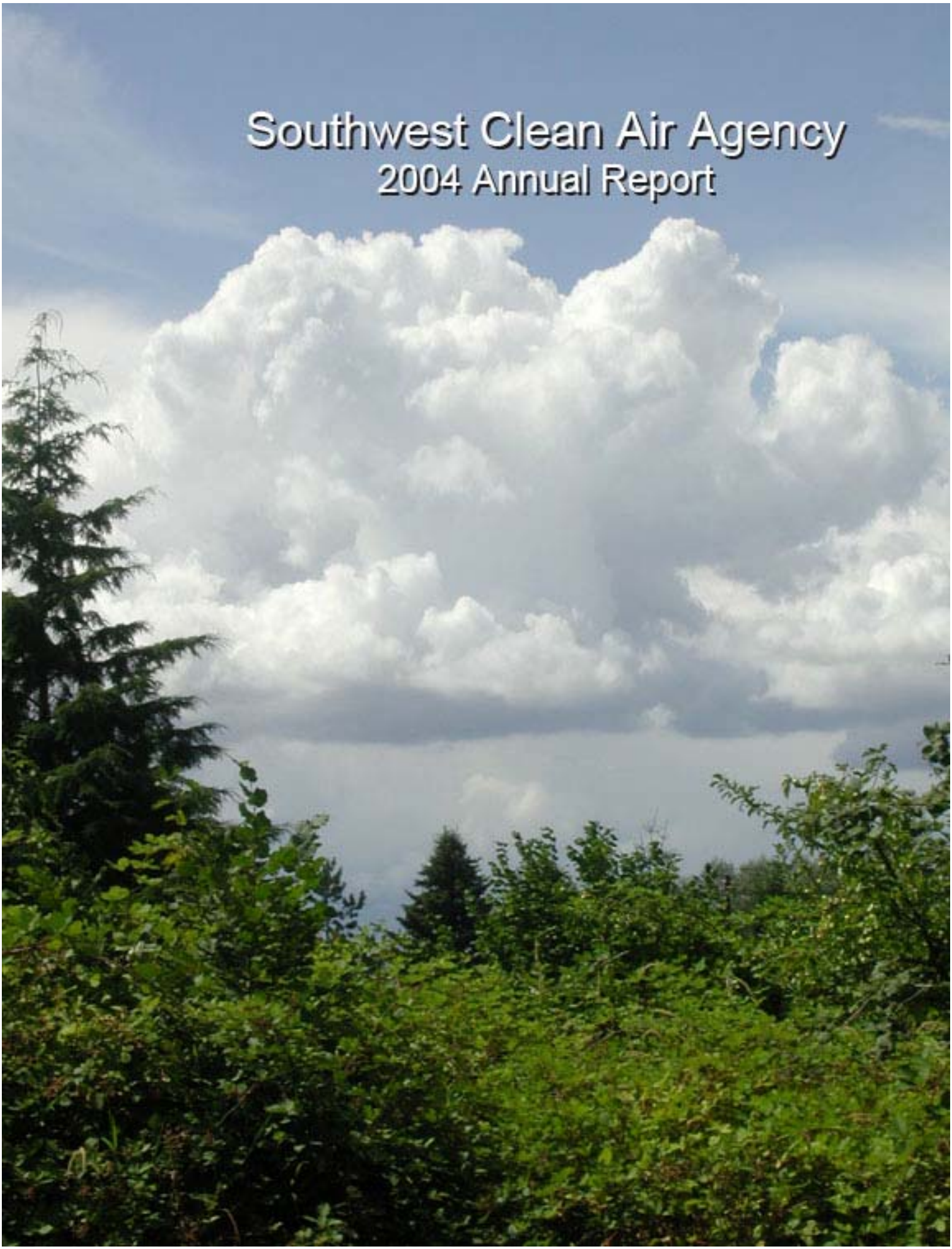
Southwest Clean Air Agency
2004 Annual Report

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Southwest Clean Air Agency
Vancouver, Washington

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The Southwest Clean Air Agency (SWCAA) board members represent each county and the major cities within the region. In addition, one member-at-large completes the eleven-member board. The board is the policy making arm of the Agency and adopts Agency regulations.

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From the Executive Director

Southwest Washington once again maintained healthy levels of air quality in 2004 with no exceedances of air quality standards of any pollutant for the sixth consecutive year. However as the Vancouver area shares its air with Portland, Oregon, we will continue our efforts to prevent unhealthy air quality in our growing region.

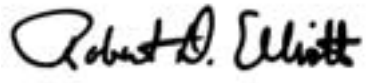
In June of 2004, the Vancouver switchyard became the first in the western United States to retrofit switchyard locomotives with emissions reduction equipment. Air pollution and noise pollution was reduced by as much as 90% in the three locomotive engines receiving this equipment. SWCAA was awarded an $85,000 EPA grant to achieve this success.

Approximately 175 school buses in southwest Washington received diesel oxidation catalysts in 2004 through funding provided by SWCAA and the state legislature. These retrofits reduce the diesel emissions exposure of school children while riding on the buses.

The Columbia River Gorge Air Quality Monitoring Project continued to make strong progress through 2004. Nine nephelometers monitored haze at various points throughout the Columbia River Gorge, in addition to monitors measuring for sulfates, nitrates, elemental and organic carbon. Once all of the monitoring has been completed, the data will be combined with meteorological data to model the scope and behavior of air pollutants. This information will likely be used to develop a regional strategy to address the issues of haze and air pollution in the Columbia River Gorge.

SWCAA also implemented a toxics monitoring program in the Longview/Kelso area, using funds from a $55,000 EPA grant. The monitors measure up to 130 different toxic air pollutants the project will gather valuable data to get a better understanding of the nature of the area's air pollution. The results will be compared to toxic monitoring and modeling results for other similar metropolitan areas to determine if a higher than normal risk is indicated for the Longview/Kelso area. If a high risk is determined to exist, additional analysis may be warranted.

Thank you for your help in making 2004 another successful year for our region's air quality.



Robert D. Elliott
Executive Director
Southwest Clean Air Agency

Clean Air Washington Act

The Clean Air Washington Act of 1991 was the most important legislation in the history of clean air in Washington declaring air pollution as the most important environmental problem. The Act establishes two objectives: to prevent the deterioration of air quality in areas that already have clean air, and to restore air quality in other areas to levels that protect human health and the environment. The Act encompasses issues including outdoor burning, wood stoves, motor vehicles, industrial pollution, global warming and ozone depletion.

Outdoor Burning

Outdoor burning includes many kinds of fires, from leaf burning in a resident's backyard to burning of forest harvest slash. This accounts for more than ten percent of Washington's air pollution by releasing carbon monoxide, volatile organic compounds, particulate matter and toxic air pollutants.

Although fire is a quick and easy way to dispose of yard and land clearing debris, outdoor burning is also a growing health problem and is the number one cause of public nuisance complaints. Fortunately, alternatives to burning are becoming more common. Clean Air Washington required commercial and residential outdoor burning to be phased out in urban growth areas over 5,000 in population by 2001, as composting and other reasonable alternatives become available. In areas that do not meet federal standards for carbon monoxide or particulate matter, outdoor burning is banned. In some areas of SWCAA jurisdiction the local fire districts have cooperated in the program by permit issuance and, in some cases, enforcement of the rules. Within the Clark County non-attainment (now maintenance) area, all outdoor burning has been curtailed since 1994. (For a map of this area, see Appendix A.) State legislation has allowed qualified agricultural burning to continue in the non-attainment areas of Washington. Under the definition provided in the legislation, agricultural burning can take place if the land use can be determined to be commercial in nature. In this case the farmer must be able to produce a recently filed IRS Schedule F form indicating that the venture is a commercial operation. Qualified agricultural burning may require a permit and can only take place on days with good dispersion of the air contaminants generated. Major efforts have been devoted to defining "agricultural burning" on a statewide basis, as separate and distinct from "outdoor burning" or other types of burning. The scope of this definition is important, as it affects many members of the agricultural community and the citizenry as a whole. No burning is allowed when SWCAA calls air stagnation advisories or when fire protection authorities call safety burn bans.

Wood Stoves and Fireplaces

There has been a continuing rise in ownership of wood stoves, pellet stoves, fireplace inserts and fireplaces. Wood burning devices are the most polluting means of home heating. This problem is magnified because they are used only about one half of the year – during the winter heating season, which is commonly a time of stagnant air and inversions. This atmospheric condition traps wood smoke close to the ground where it is inhaled. In addition, burning often takes place in the neighborhoods we live in, where our children, and adults as well, spend two-thirds of their time. The Clean Air Washington Act set tougher emission standards for new wood stoves and fireplaces. The Act also established an increase in fees assessed on new wood stove or fireplace inserts to $30. This revenue is used for wood stove education and enforcement programs. Installation of used, uncertified stoves is banned. New buildings in areas that exceed federal standards for particulate matter must have an adequate non-wood heat source.

Motor Vehicles

Motor vehicles are southwest Washington's largest air pollution producer, and their use is steadily increasing. Motor vehicle use is growing significantly faster than our rate of population growth. Clean Air Washington is designed to reduce motor vehicle pollution and remove tens of thousands of vehicles from southwest Washington's roads during peak commute hours. This will not only improve air quality, but also reduce traffic congestion at the same time. To do this, Clean Air Washington concentrates on three separate motor vehicle issues: motor vehicle emission inspections, clean fuels and conformity. Transportation Demand Management, a companion effort, is authorized by separate legislation.

Motor Vehicle Emission Inspection and Maintenance (I & M)

Vehicles registered in certain areas of the state must pass an inspection of their emission control systems – or be granted a waiver – in order to be re-registered. The inspection program identifies the worst polluting cars and trucks and requires vehicle owners to correct the problem. And, for the first time, Clean Air Washington adds diesel vehicles to the inspection program. Federal law expanded the vehicle testing and inspection program to include the greater Vancouver area in 1993. The first test station opened in June 1993 in the North Vancouver area, followed in May 1995 by a second location in the Cascade Park area of Vancouver. In 1996, the testing area was expanded to include the areas of Battle Ground, Brush Prairie, LaCenter and Ridgefield as part of the Agency's ozone maintenance strategy. Vehicles in this expanded area began testing in April of 1997.

Clean Fuels

Clean Air Washington requires the development of specifications for "clean fuels" – fuels that result in lower emissions of air pollutants than today's gasoline and diesel motor fuels. Some potential clean fuels include compressed natural gas and electricity. Thirty percent of new vehicles purchased by state government must be clean fuel vehicles. This requirement increases five percent every year. A matching grant program is established to promote local government clean fuel programs. Through federal regulations the lead content in gasoline steadily declined until December 31, 1995. Since this date it has been illegal to sell leaded gasoline for highway use throughout the U.S.

Conformity

The objective of conformity is to ensure that transportation construction dollars are spent on projects in ways that improve – or at least, do not worsen – air quality. Clean Air Washington mirrors federal requirements for federally funded transportation plans and projects to conform to air quality improvement plans.

Transportation Demand Management

Transportation Demand Management (TDM) or Commute Trip Reduction, although enacted under legislation separate from the Clean Air Washington Act, is closely related to the motor vehicle issues addressed by Clean Air Washington. TDM helps solve transportation-related air pollution, energy and congestion problems by promoting changes in driving behavior. TDM in Washington focuses on commute trip reduction efforts. It promotes alternatives to single occupant vehicles, such as transit, carpools and vanpools, cycling, walking and telecommuting. Clean Air Washington directs local governments in Clark County to adopt Commute Trip Reduction ordinances and plans. It also requires major public and private employers to adopt and implement Commute Trip Reduction programs after local jurisdictions have adopted their plans. To do this, companies and

local governments can offer incentives such as parking incentives for carpoolers and alternative work schedules. The Washington Department of Transportation has the main responsibility for implementing Commute Trip Reduction (CTR). Further details can be obtained by contacting C-TRAN at 360-696-4494 for their progress with CTR.

Industrial Sources

Clean Air Washington requires the largest industrial air pollution sources (major sources) in the state to have federally enforceable air operating permits (AOP). Prior to this requirement, Washington was one of the few states in the United States without renewable industrial permits. These new permits are renewed every five years or less and in many cases require additional monitoring and recordkeeping. Smaller sources that emit hazardous air pollutants (HAPs) or operate in areas where air quality exceeds federal health-based standards may also require an AOP. Clean Air Washington authorizes SWCAA to request delegation of this air operating permit program from the U.S. EPA so that this program can be administered at the local level. The Southwest Clean Air Agency received delegation of the AOP program in December 1994 and is swiftly moving toward meeting all the necessary commitments of the program. The first round of Air Operating Permits was completed in December 2001.

Climate Change and Ozone Depletion

Chlorofluorocarbons (CFCs), carbon dioxide, methane, nitrous oxide and certain other gases are known as “greenhouse” gases. They trap energy from the sun in the lower atmosphere, contributing to a gradual warming of the earth’s surface. CFCs also contribute to depletion of the layer of ozone in the upper atmosphere that filters harmful ultraviolet rays. Clean Air Washington requires people who repair, service or dispose of any motor vehicle air conditioning system, commercial or industrial air conditioning, heating or refrigeration system or consumer appliance that uses ozone depleting chemicals to recover and recycle them. It also bans the sale of nonessential products containing gases harmful to the ozone layer if substitutes for the products are readily available. Examples of these products include air horns, noisemakers, party streamers and certain cleaning sprays.

Future Priorities

SWCAA continually refines program priorities and the measurements that will be used to identify air quality improvements and success in achieving those priorities. SWCAA’s future priorities include:

- Maintaining a “clean air” classification for the entire SWCAA region through sound management practices, public education, and contingency measures.

- Reducing motor vehicle exhaust emissions by supporting the Washington Department of Ecology’s (WDOE) efforts in the inspection of all registered vehicles in emission inspection areas and ensuring they are properly tuned or repaired as needed.

- Reducing vehicle miles traveled in the region through increased public awareness of motor vehicle pollution and resulting lifestyle changes.

- Maintaining ambient monitoring capabilities for “real-time” measurements that provide for more timely burn ban alert calls and better protection of the public’s health.

- Continuing with development of urban visibility data, maintaining the visibility monitoring program for the urban Vancouver area.

- Participating with the Oregon Department of Environmental Quality, U.S. Forest Service, the Columbia River Gorge Commission, and the public in the process of assessing and protecting the air quality and visibility in the Columbia River Gorge National Scenic Area.

- Participating with member states and the public in the Western Regional Air Partnership to develop a strategy for complying with the U.S. EPA's new Regional Haze Rule. The rule requires restoration of original visibility conditions in national parks and wilderness areas by 2064.

- Participating with the Northwest Collaborative Air Priorities Partnership (NWCAPP) to set priorities and take action to improve and protect air quality in our region. The project brings together individuals and organizations from Alaska, Idaho, Oregon, Washington and Canada to establish regional air quality priorities.

- Reducing emissions of toxic air pollutants and criteria air pollutants from existing industrial facilities through the application of reasonably available control technology (RACT).

- Assisting the Waste Reduction, Recycling and Litter Control program in meeting its goal of reducing hazardous waste generation through encouragement of technologies that reduce hazardous air emissions.

- Supporting comprehensive strategies and curricula for air quality education in grades K through 12, including teacher workshops and classroom presentations.

- Maintaining and improving upon a comprehensive inventory of air pollutant emissions in SWCAA's five county jurisdiction.

- Providing timely review of industrial and commercial applications for new construction permits.

- Supporting the development and long-range improvement of intra-county transportation.

- Supporting the goal of the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 and its successor act, the Transportation Equity Act for the 21st Century (TEA-21) of 1998, to more adequately integrate clean air planning and transportation planning.

- Developing rewards and incentives for citizens to switch to cleaner energy, transportation, and lifestyle options.

- Promoting bicycle lanes and the use of bicycles as a means of alternate transportation.

- Continuing public education and public information efforts to expand citizen awareness on air quality issues and the impact of individual activities on the air quality environment.

- Involving our citizens in the regulatory process.

- Promoting life style changes that contribute to improved air quality not only in southwest Washington, but also throughout the state.

- Facilitating the installation process of emission reduction technology onto eligible school buses throughout the region.

Many of the priorities listed above are readily achievable today.

Significant Activities Completed During 2004

- Retrofitted three switchyard locomotives with emissions reduction equipment through a grant of $85,000 from EPA. This innovative technology reduced diesel emissions by 90 percent and has the additional bonus of dramatically reducing noise pollution to the surrounding community.

- Conducted another Wood Stove Rebate Program for residents of southwest Washington, using grant funds. The $250 rebates were toward the purchase of a new low-emission certified wood stove, with the replacement and destruction of an old, uncertified wood stove. This project stimulated the sale of 81 new low air pollution certified wood stoves.

- Implemented a $670,000 grant from EPA to conduct the Columbia River Gorge Air Quality Study.

- Implemented a $55,000 grant from EPA to intensively monitor the levels of toxic air pollutants in the Longview/Kelso area.

- Began overseeing the installations of diesel oxidation catalysts on diesel school buses throughout southwest Washington. These retrofits will dramatically reduce children's exposure to toxic diesel emissions.

SWCAA Operations

History

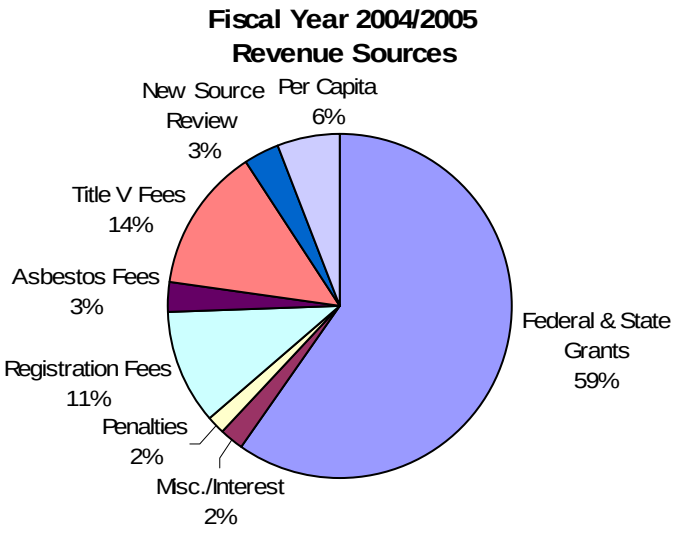
In October 1967 the Agency was formed as a single county jurisdiction serving Clark County. For a time the agency's work was accomplished as part of the Southwest Washington District Health Department. In April 1968 a resolution was passed and recorded that expanded the agency's jurisdictional boundaries to the five present counties, Clark, Cowlitz, Lewis, Skamania and Wahkiakum Counties. Business rules were adopted in 1968 followed by the first regulation, known as "Regulation 1" on December 17, 1968. On October 28, 1969 "Regulation 2" was added. While Regulation 1 dealt primarily with general requirements, Regulation 2 expanded this regulatory base by addressing such things as permissible ambient concentrations, acceptable contaminant levels from industrial stacks and odor limits. These two regulations remained in effect until December 1979 at which time they were superseded in order to comply with federal and state laws and to include many of the provisions within the federal and state regulations. The Agency's General Regulations for Air Pollution Sources was then adopted. These regulations closely paralleled the Washington State Department of Ecology's General Regulations, yet included specific portions of the Agency's earlier versions. Over the years, the Southwest Clean Air Agency (SWCAA) has attempted to maintain current regulations that include the most up to date standards as mandated by the federal and state statutes.

SWCAA is a five county regional air pollution control agency responsible for the vast majority of air pollution control in that region. SWCAA's jurisdictional area consists of Clark, Cowlitz, Lewis, Skamania and Wahkiakum counties.

Agency Funding

The SWCAA budget is based on a fiscal year concept beginning July 1 and ending June 30 of each year, as provided in RCW 70.94.092. Revenue to fund the programs administered by SWCAA comes from a wide range of sources. Grants are received from the State of Washington and the U.S. Environmental Protection Agency as core or supplemental funds. Core grants are relatively general in nature and can be used to cover the costs incurred by the Agency's basic core programs. Supplemental grants are sometimes provided to fund dedicated special tasks, such as establishing new monitoring sites or installing pollution reduction equipment. SWCAA currently has a per capita assessment in the amount of $0.30 per citizen, which is levied through the normal taxation process of the area's counties and cities.

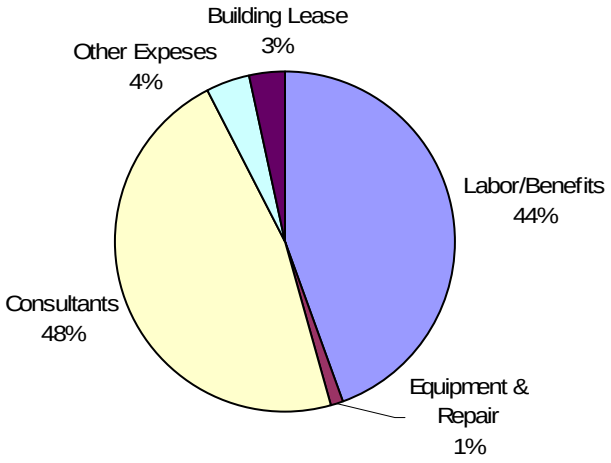
The Agency also receives revenue from registration fees, new source review fees and Title V permit fees. Penalties collected for violation of the rules and regulations of SWCAA are transferred into the fiscal year budget in the following year after collection. The adjacent pie chart provides an overview of the relative contribution from each funding source to SWCAA's fiscal year 2004/2005 budget.



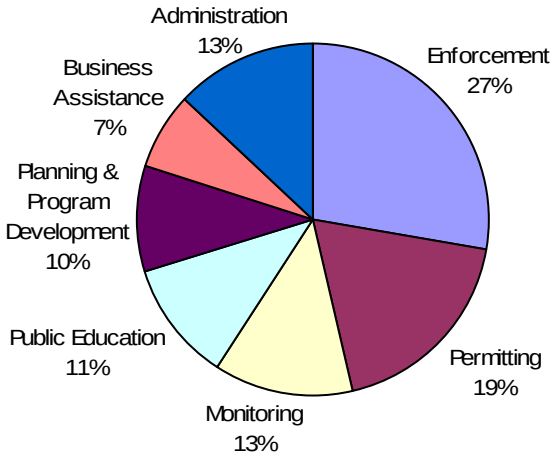
The adjacent pie chart shows the relative distribution of expenditures for the same budget period. A significant portion of the budget consists of two grant funding sources: the federal grant for air quality studies in the Columbia River Gorge National Scenic Area, and the state grant for retrofitting diesel school buses with air pollution control equipment.

The pie chart below shows SWCAA staff labor distribution for fiscal year 2004/2005.

Fiscal Year 2004/2005
Breakdown of Expenditures



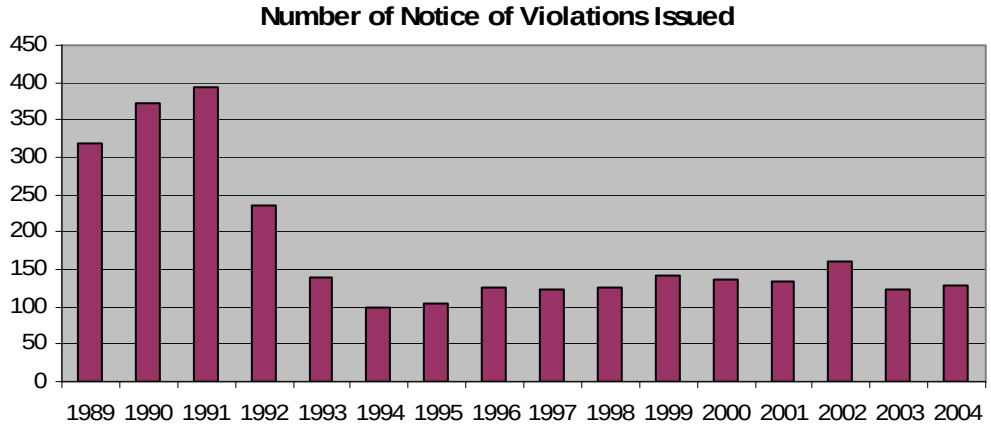
Distribution of SWCAA Labor by Program
(based on person hours)



Field Operations

Introduction

SWCAA's field operations consist of a diverse blend of inspections, complaint response, public education, ambient air monitoring, emissions inventory, and enforcement activities. Field employees are expected to be certified to record visual emissions. This is accomplished through a coordinated effort of certification through North West Opacity Certification and the Oregon Department of Environmental Quality. Once the employees have received their initial certification, utilizing the criteria of EPA Method 9, recertification is required every six months. This method enables the inspector to evaluate the degree of opaqueness of a plume and record this as a number from zero to 100 percent opacity. The field staff is often called upon to issue Field Notices of Correction/Violation. These can be the result of a verified citizen complaint, excessive visual emission readings, illegal burning, violation of the operating stipulations contained in a company's Order of Approval, odor violations or exceedance of emission limits in new source review approvals. After the Field Notice of Correction/Violation has been issued, a determination is made by management on appropriate follow-up actions. The Executive Director may take several courses of action as a result of these field notices. The Agency could issue a formal corrective notice outlining what action is required to regain compliance. This is sometimes done in first offense cases or when it is felt that the violating party was not aware of the regulatory requirements. A civil penalty assessment of up to $10,000 per violation, and/or an Administrative Order requiring corrective actions are other options. The agency also has the ability to proceed with criminal charges, or any combination of these actions.



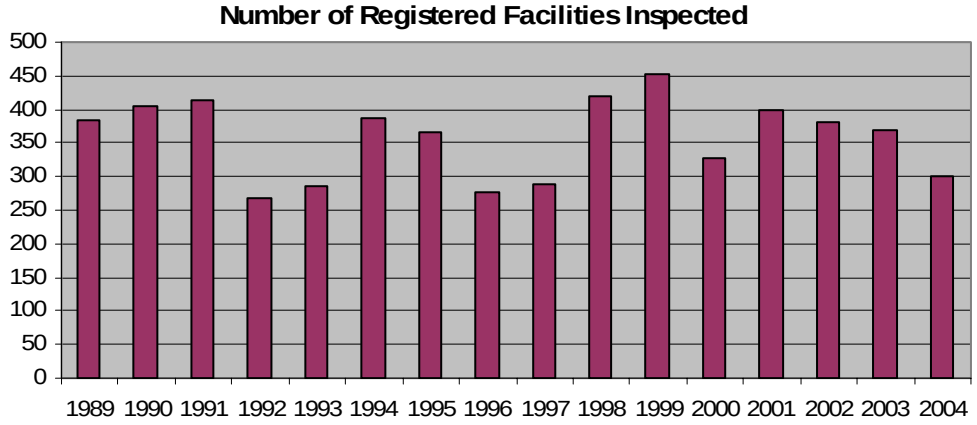
Since 1991 SWCAA experienced a trend showing a reduction in Notices of Violations. This trend has leveled since 1995. This reduction was due to a number of factors. The banning of outdoor burning in the major population areas and good citizen compliance could be credited for some of this reduction. In addition, it is believed that the Agency's stepped-up public outreach program has made a difference.

Any punitive decision involving a violation of the Agency's regulations can be appealed. Normally, these appeals are heard by the Washington State Pollution Control Hearings Board (PCHB). The purpose of the PCHB is to give all litigants a full and complete public hearing and provide a fair and impartial written decision based on the facts and the law. By establishing the PCHB to preside over environmental cases it speeds up the hearing process and reduces the caseload on the other court systems. To ensure the Board's impartiality, the state Legislature created this independent, quasi-judicial state agency, entirely separate from any other state, regional or local unit of government. The Board consists of three full-time members, who are appointed by the Governor and confirmed

by the State Senate for staggered six-year terms. One of the three must be an attorney. All are salaried employees of the State, who also serve on the Shorelines Hearings Board.

Registration of Sources

Each facility having a potential for emissions of 1 ton per year of all criteria pollutants combined, but less than 100 tons per year of each, is carried on a registration tracking system by the Agency. In order to offset the cost of site inspections to the taxpayer, SWCAA charges these sources annual fees of $75.00 per emission unit, $39.00 per ton of criteria emissions and $10 per ton of toxic air emissions. The exception is gasoline transport tankers, which are charged $50.00 per tanker unit. A facility may have only one emission unit, or many, depending upon the type of operation. While these fees are not adequate to pay for the entire registration and inspection program, they do defray some of the cost. SWCAA registers numerous air contaminant-emitting facilities, commonly referred to as "sources." This registration system is facilitated and maintained through a program of rotating compliance inspections and reporting. After a field inspection of a source has been completed, an inspection report is prepared on a standardized format. This report outlines all of the Air Discharge Permits issued to the source, the approved Emission Units and associated equipment, all of the emission limits, operating limits, monitoring/recordkeeping requirements, and reporting requirements, and the observed compliance status of each requirement. If a violation is found, a Field Notice of Correction/Field Notice of Violation (FNOC/FNOV) is issued, facilitating follow-up enforcement and/or corrective action. Inspections are repeated on an annual to five-year cycle, based on the size, emission impacts and the complexity of the sources.



Title V Air Operating Permit Program

Title V of the Federal Clean Air Act, and subsequently 40 CFR Part 70, requires permitting authorities to issue renewable Air Operating Permits to major sources of criteria and hazardous air pollutants for a fixed term of up to five years. These permits apply to sources that emit more than 100 tons per year and the permits are to be uniform in nature and content throughout the United States. The purpose of the Air Operating Permit program is to compile all applicable requirements into one document. The goal is to improve source compliance. The permit issuance process begins with submittal of applications and certification statements by the owners or operators of sources and includes provisions for a public comment period, hearings if necessary, as well as review of draft permits by EPA and affected states.

EPA published a notice in the Federal Register on November 9, 1994 granting interim approval of SWCAA's Air Operating Permit Program. This program became effective on December 9, 1994. Minor deficiencies prevented SWCAA and other Washington local air agencies from obtaining final approval of the program at that time. All corrective measures requiring action by the Department of Ecology and the Washington legislature have since been completed.

Through 2004, 25 complete Title V Air Operating Permit applications have been received from major sources in SWCAA's jurisdiction. In 2004 staff spent time preparing information packets for permit renewals, processing permit modifications for existing permits and modifying synthetic minor, or Title V Opt-Out applications. Synthetic minor, or Opt-Out Sources, are facilities that voluntarily limit their operations to maintain emission levels below the threshold for Title V permitting. There were 21 active synthetic minor sources in SWCAA's jurisdiction at the end of 2004.

Outdoor Burning

In late 1992, SWCAA adopted a program to permanently eliminate outdoor burning within the southern Clark County carbon monoxide non-attainment area by the end of 1994. Three phases of curtailment were established based on availability of alternate methods of disposal. The burning in the last phase came to a conclusion on November 6, 1994. Beginning on January 1, 2001 the Washington Clean Air Act required that the ban on outdoor burning be expanded to include all urban growth areas with a population of greater than 5,000 and within city limits with a population of greater than 10,000 residents. These new areas where outdoor burning is banned include the Battle Ground and Centralia/Chehalis urban growth areas and within the city limits of Longview/Kelso. In compliance with the Washington Clean Air Act's reasonable alternative criteria, a policy was adopted to ban outdoor burning in areas where alternatives to burning are reasonably available and the population density is greater than 1,000 residents per square mile. This policy resulted in the expansion of the Longview/Kelso no burn boundary into areas north of the Longview/Kelso city limits. In all other areas of SWCAA's jurisdiction citizens may burn, but they must obtain approval and/or permits and can only burn natural vegetation.

Outdoor burning is the leading cause of public nuisance complaints received by the Agency. SWCAA receives and investigates hundreds of complaints each year, as is shown in the graph on page 16. Of the 482 complaints received by SWCAA in calendar year 2004, 287 of these were the result of outdoor burning activities. Most of these complaints fall into one of three categories: 1) smoke nuisance, 2) burning by sources that are not legally permitted to burn, or 3) the burning of prohibited materials. These complaints are investigated and if a violation is noted, a Field Notice of Correction/Violation is issued.

The way agricultural burning is managed changed considerably in Washington State in the mid-1990s. This change is part of a comprehensive revision of the state's air pollution laws that affects not just agriculture, but many other commercial, industrial, residential and municipal activities. In December 1994, WAC 173-430 "Agricultural Burning" was adopted and became effective early in 1996. WAC 173-430 allows agricultural burning in some areas where all other forms of outdoor burning are prohibited. Burning is only allowed by individuals that can provide an Internal Revenue Service Schedule F form, indicating a commercial agricultural operation, and if no reasonable alternatives exist according to *Best Management Practices*. Thus qualified, the individual must apply for a permit, depending on the nature of the proposed burning.

Wood Stoves and Fireplaces

The smell of wood smoke evokes pleasant memories for many people, but for others it presents a health problem. Wood smoke, largely from wood stoves and fireplaces, has become a major part of the air pollution problem in the United States and particularly in the Northwest. Many residents believe that burning wood will cut their heating bills though this may not be the case when all of the costs of wood burning are considered. A growing body of evidence suggests that we cannot ignore the medical consequences of extensive exposure to wood smoke.

Smoke is composed of many small particles of carbon compounds from the burning of organic matter such as wood, coal or oil. This small particulate matter is called PM_{10} (particles less than 10 microns in diameter). The majority of PM_{10} in wood smoke is small enough to reach the deepest

pockets of the lungs and pose the greatest health threat. This most harmful particulate matter is called $PM_{2.5}$. PM_{10} and $PM_{2.5}$ are regulated by the EPA and by SWCAA as two of the criteria air pollutants.

In SWCAA's jurisdiction, wood stoves and fireplaces account for approximately 18 percent of the total PM_{10} air pollution, produced mostly during the winter months. This is also the time when stagnant air and temperature inversions are likely to occur. These conditions limit air movement, "trapping" the pollution close to the ground and keeping it within our breathing space. All new stoves sold in the state of Washington must be EPA certified stoves that are required to meet federal emission standards. In addition, there are visual emission standards that are enforced by SWCAA on all wood heating devices. Dry fuel and adequate amounts of combustion air for the fire are necessary to avoid exceeding these standards. A good fire produces no smoke with only heat waves visible at the outlet of the chimney.

SWCAA will curtail wood stove and fireplace use when the ambient concentration of either carbon monoxide or PM_{10} threatens to exceed health standards. If this happens, local newspapers, radio and television stations will be notified. A Stage I alert prohibits the use of fireplaces and uncertified stoves. A Stage II alert prohibits the use of certified wood stoves. Wood stoves that are the sole source of heat for the residence are not affected by these prohibitions. However, no wood stove is allowed to operate with visible smoke that exceeds 20 percent opacity. No curtailments have been called within SWCAA's jurisdiction for several years.

SWCAA received 67 complaints related to woodstove and fireplace activities during 2004. These complaints were either investigated in the field for compliance/enforcement purposes or the party received a letter providing information on proper use of their wood burning devices and how to limit impact to the airshed and neighbors.

The Agency maintains a recorded message in order to disseminate burning information. The public can call either the normal business number of (360) 574-3058 or the 24-hour burn information hotline of (360) 574-0057.

Asbestos

Asbestos is a name given to a group of minerals found naturally in our environment. They are flexible in nature and serve as an excellent insulation for fire and heat resistance. Unfortunately, asbestos is also comprised of tiny respirable fibers that have been directly linked to serious health problems. These fibers can cause asbestosis, a scarring of the lungs, which can lead to breathing problems and heart failure. In addition, it can cause cancer of the lungs and mesothelioma, a rare cancer of the chest or abdominal lining. There is also evidence that links asbestos to cancer of the stomach, intestines and rectum.

Unlike many other air contaminants, asbestos has no known safe exposure level. It is believed that minute concentrations of asbestos fibers, either breathed in or swallowed, can cause cancer in humans.

For many years, asbestos was commonly used for insulation against heat damage and fire hazard. It was used for insulation around commercial and industrial boilers and their steam pipes, as well as in floor tile, glues, roofing, insulation around fireplaces and wood stoves, plaster, patching and spackling compounds, and in automotive brake linings. Although less common, many of these products remain in use today.

There is no question asbestos has distinct advantages for thermal insulation. Unfortunately, the related health effects far outweigh the beneficial properties it possesses. Also tragic is the fact it takes from 15 to 40 years for any sign of health problems to manifest themselves. This is why it was

not until many years after the end of World War II that the problem was recognized and corrective actions began. During the war years, shipyard workers were exposed to large quantities of asbestos in the ship building process.

In order for asbestos to become a health problem it must first be released into the air we breathe, or contaminate products we ingest. As long as the asbestos stays “encased” or intact and never gets to the air, there is little danger associated with it. Unfortunately, asbestos is not always closely contained. As insulation, fire proofing, roofing materials and other products are exposed to normal day-in and day-out traffic, the material begins to break down and the asbestos fibers begin to separate from their bonding agents. As a consequence, the fibrous compounds can eventually become airborne. Asbestos subject to airborne release by such mechanisms is termed “friable.”

During remodeling or demolition projects, glues and adhesives are often sawed and sanded. If those products contain friable asbestos, significant airborne contamination and an unhealthful atmosphere for the workers and residents can result. Even at dump sites, if not handled properly, friable asbestos can become airborne as a result of heavy earthmoving equipment and other vehicles driving over it. For this reason, special precautions must be implemented even during the ultimate disposal.

Prior to beginning any renovation or demolition work on structures within SWCAA’s jurisdiction, an asbestos survey must be completed by an AHERA certified contractor. Before any friable asbestos can legally be removed, or encapsulated, the contractor must submit a notification form to SWCAA, called a “Notice of Intent to Remove or Encapsulate Asbestos.” In order to process this request and ensure that all responsible parties, including the Washington Department of Labor and Industries (L&I), are properly notified, the notification must be received at least 10 days prior to commencement of the job. Information required includes a site description, method of handling the waste, amount of material, specific type of asbestos, and final disposition of the material. For all demolition projects, including intentional burning of structures for firefighter training, a “Notification of Demolition or Renovation” form must be submitted to SWCAA, even if no asbestos is found by the survey. Again, 10-day advance notification is required. This ensures that only asbestos-free structures are demolished. Working with L&I and the U.S. EPA, SWCAA tracks removal, encapsulation, demolition, and renovation projects and makes sure all jobs are conducted by licensed contractors who are trained and certified in survey, removal, and disposal practices.

The asbestos is tracked to its ultimate disposal site in order to ensure it is properly handled and disposed of. This material, because of the health risks associated with it, is not intermingled with the other refuse, but handled separately and covered daily.

During 2004 a total of 481 asbestos project notifications were received and reviewed by SWCAA, no asbestos-related complaints were received, and five asbestos removal and encapsulation projects were inspected. In order to offset the cost of administering this program, a fee is required on each notification. The fee amount varies depending upon the type and size of the project.

Gasoline Vapor Recovery

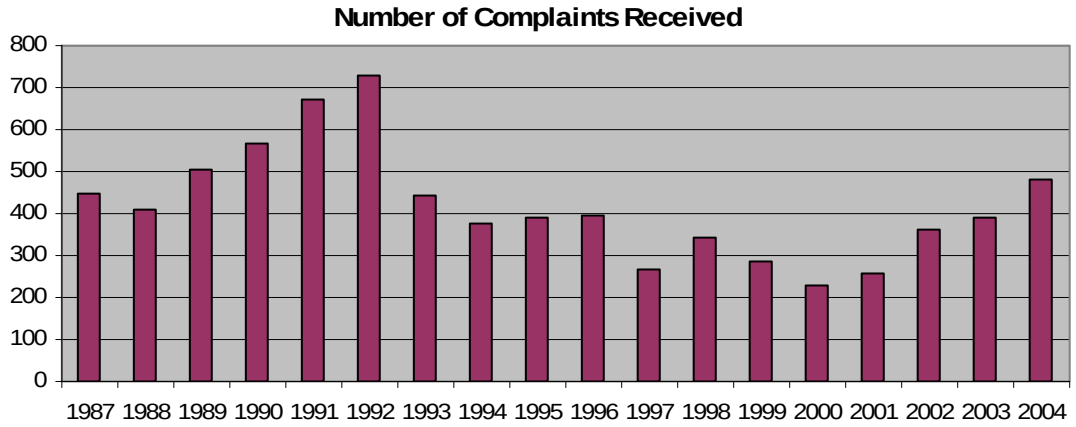
Gasoline dispensing facilities, bulk handling terminals and gasoline hauling tank trucks can release fumes into the ambient air. These vapors contribute to ozone smog and contain toxic and cancer causing compounds. Toluene, xylene and the state’s second leading cancer causing air pollutant, benzene, are contained in these emissions. As gasoline enters an enclosure, vapors are displaced. In the past these vapors were vented directly into the atmosphere, however new requirements prohibit many of these uncontrolled emissions sources. Many gasoline-dispensing facilities are now equipped with Stage II vapor recovery controls. These controls capture and recover the displaced vapors as the vehicle’s gasoline tank is filled. All of the larger gasoline-dispensing stations were required to install Stage II vapor recovery controls by May 1, 1994. In 2004, two gasoline stations

applied for approval to install Stage II vapor recovery systems, one in Cowlitz County and one in Lewis County.

Even more gasoline dispensing facilities are equipped with Stage I control, which captures and controls the fumes during tank truck delivery operations. Vapors can be lessened with Stage I control as a result of submerged fill tubes. By extending the length of the fill tube in the bulk storage tanks below the surface of the gasoline, fewer vapors are released into the atmosphere. All new and upgraded tanks and all facilities with greater than 360,000 gallons per year throughput are equipped with this type of control.

Citizen Complaints

SWCAA tries to effectively cover the five county area of its jurisdiction as frequently as possible, but the Agency's field staff can not be everywhere all of the time. For this reason, citizen complaints are used to help locate problems and violations. The sharp reduction in complaints occurring in 1993-94 and sustained through 2000 appears to coincide with the curtailment of outdoor burning in southern Clark County. In 2004 the number of outdoor burning related complaints received by SWCAA was 287. This is about 60 percent of all of the 482 complaints received by the agency in the year.



Public Outreach

While early efforts to control air pollution successfully focused exclusively on industrial and commercial sources, the burden of responsibility for polluted air has shifted in recent years to individual southwest Washington residents – people who drive single occupant vehicles, burn yard debris, or heat their homes with wood.

Beyond encouraging voluntary cooperation from citizens to minimize air pollution, SWCAA assists and/or operates several air quality control programs that focus on "people-caused" pollution. Probably the most familiar of these programs is the mandatory motor vehicle emissions testing which was implemented in June of 1993. Other examples are the phase out of backyard burning in the Vancouver metropolitan area and the statewide wood stove certification program designed to reduce emissions.

A major public education program was initiated in 1994 by SWCAA. This included classroom training for teachers in air pollution issues. This training program was sustained through 2004 with two workshops in Clark County and the distribution of 17 Environmental Resource Guides (ERG) to teachers and educators within our five-county jurisdiction. Also, an interactive computer program, which explains a variety of air pollution subjects, was placed in 24 public and private facilities throughout SWCAA's jurisdiction. Schools, businesses and governmental facilities wanting to use this equipment should call SWCAA for information and scheduling.

In an important continuing program, C-TRAN provided free bus rides on high ozone air pollution days that are designated Clean Air Action Days. In 2004 five Clean Air Action Days were called. Typically, a significant increase in C-TRAN ridership is realized on these days when C-TRAN waives ticket fees.

Residents of southwest Washington are encouraged to participate in air pollution control. No regulations affecting the area's air quality are adopted by the Agency's Board of Directors without a prior public hearing, where the participation of any interested person is welcome. Copies of proposed rules, or rule changes, are available well in advance of the hearings. We encourage the public to contact SWCAA for handouts and further information, or visit the agency website at www.swcleanair.org.

Successful government relies on the support of an informed public. This report, published every year, updates SWCAA's air quality activities, and summarizes air-monitoring data collected. SWCAA publishes other reports and pamphlets that are available to the public. Increasing emphasis will be placed by the Agency on this program in the future.

Business Assistance

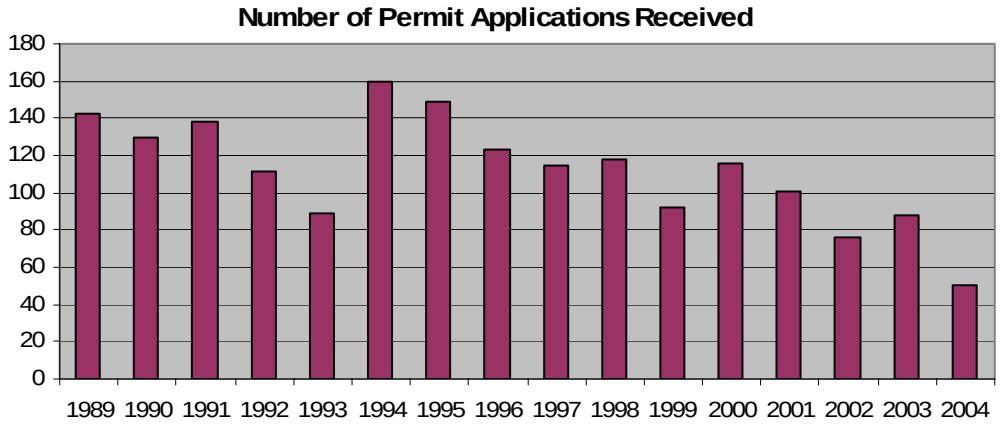
Clean Air Washington requires that SWCAA establish a business assistance program to help companies understand air quality regulations and to aid them in complying with the requirements of those regulations. Formerly provided through contract with the Columbia River Economic Development Council (CREDC), this service was assumed by SWCAA staff in July 1998. This approach was developed in order to keep the program entirely under the control of SWCAA and ensure that all communication is direct with SWCAA engineers and specialists. The business assistance program is multifaceted and provides general, technical and developmental assistance to the business community. Public assistance is provided on all of the agency's processes including permit applications and approvals, Best Available Control Technology (BACT) analysis, emissions calculations, registration requirements, applicable rules and regulations, and compliance assurance.

Engineering

New Source Review

Prior to the construction of any new source of air contaminants, or modification to existing sources, SWCAA must review the proposal in order to determine if the project will conform to the criteria generally associated with Best Available Control Technology (BACT). SWCAA's approval must be granted before any construction can legally take place. In order to help offset the cost of this review a $300.00 filing fee is required with each application plus an additional review fee. The additional amount is based upon the size and complexity of the source.

After the Agency's review has been completed and SWCAA is satisfied that the proposal can be built in a manner that will not violate any portion of the State or Federal laws pertaining to air pollution, an order called a "Preliminary Determination" is issued. This document is sent to the Applicant and EPA. A public notice for the project is published in the local newspaper where the construction is intended to take place, announcing their plans. The document and its recommendations remain open for public input and comment for thirty days. The engineering staff then reviews it once again, including any public comments that may have been received. The public's input is then used in order to make the final approval determination. If the comments do not outweigh the initial preliminary determination results, "final approval" is granted. A copy is mailed to the U.S. Environmental Protection Agency and the original is sent to the Applicant.



A total of 50 Permit Applications were received during calendar year 2004. That number consisted of 33 Applications in Clark County, eight in Cowlitz, nine in Lewis, and none in Skamania or Wahkiakum counties. Eighty-two Air Discharge Permits and nine Title V Air Operating Permits were given final approval in calendar year 2004.

Once built, the projects are inspected in order to determine: 1) whether the proposed equipment was actually installed as approved, and 2) whether the systems and equipment are capable of continued compliance with all applicable regulations in actual field application. Results are documented in an inspection report. If compliance issues are found, corrective and possibly enforcement actions are initiated accordingly.

Emission Reduction Credits

In the mid- to late-1980s, the greater Vancouver area was in nonattainment status for carbon monoxide and ozone. At that time, new or modified industrial sources with emissions greater than one ton/year in a nonattainment area needed to obtain emissions offsets at a ratio of 1.3 to 1.0 (i.e., a 100 ton source would have to get 130 tons of offsets). This requirement was pursuant to federal

Clean Air Act requirements. The objectives of the offset policy were to promote more cost-effective pollution control through the use of market mechanisms and to allow for economic growth within areas in which the ambient air quality standards were being exceeded.

In order to provide an easily available growth mechanism for new or modified sources in the nonattainment areas of SWCAA jurisdiction, SWCAA adopted new general regulations in 1986 that included provisions for an emission credit bank and conditions for issuance of emission credits. Accordingly, VOC and PM credits were made available for sources that emitted greater than 1 ton/year of these pollutants. The beginning balance of the private and public VOC bank was established with emission credits from the December 1982 shutdown of Carborundum, a silicon carbide processing facility in Vancouver. The Port of Vancouver purchased the Carborundum property (in 1986), requested, and was granted, 100 tons/year of PM and VOC emission credits to be able to attract new businesses to the Port. The remaining Carborundum credits were assigned to SWCAA (400 tons per year PM and 140 tons per year VOC) for attracting new businesses or expanding existing businesses.

In addition to the Carborundum credits, the SWCAA Board of Directors adopted two resolutions that added emission credits to the bank. Resolution 1988-3 adopted on July 19, 1988 allocated 1,120 kg/day VOCs, 70 percent of VOC emissions determined to be excess in the State Implementation Plan at that time, to the bank. Amended Resolution 1989-3 adopted on January 24, 1989 amended emissions to the bank to 972 kg/day, 30 percent of VOC emissions determined to be excess in the State Implementation Plan at that time.

In September of 1993, the SWCAA General Regulations (SWCAA 400) were revised to be consistent with the federal rules for nonattainment areas which only require an offset of 1.1 to 1.0 and only for new sources of 100 tons or greater or modified sources with an increase of 40 tons or greater instead of the previous 1.3 to 1.0 and 1 ton increase threshold. Most, if not all, public credit banking transactions performed by SWCAA prior to these regulation changes were for quantities less than 40 tons per year. Therefore, those sources that had requested and received emission credits prior to 1993 are no longer required to go through this process for quantities less than those described above.

Private CO and NO_x credit banks have also been established with requests for credits to be deposited from several industries due to shutdowns or modifications.

The U.S. EPA has approved neither the SWCAA credit bank nor the credit program. Each year when the Washington Department of Ecology (WDOE) and SWCAA submitted the general regulations to the EPA for update as part of the Washington State Implementation Plan, the EPA rejected the rules for the emission credit bank. This is because the WDOE and SWCAA rules for emission banking, as established in 1986, did not conform to EPA guidelines or current regulations. Therefore, the credits established under the bank were not federally recognized or approvable for large sources and could not be used for satisfying federal programs such as prevention of significant deterioration (PSD), offsets, or new source review.

The Vancouver Ozone Maintenance Plan/Redesignation Request (approved by EPA on April 30, 1997) for the Portland/Vancouver ozone nonattainment area did not account for credits in the SWCAA VOC bank in the emission inventory in the plan. However, there would have been an issue of federal enforceability and time periods to reconcile as part of proposing use of these credits. (The private NO_x and CO ERCs were accounted for in the Ozone and CO Maintenance Plans due to the fact that 1992 actual emissions were used in the Maintenance Plans and all the current CO and NO_x bank credits were accounted for in those emissions; i.e., the shutdowns occurred after 1992.) The Ozone Maintenance Plan does include a growth margin for new or modified sources, however, this margin does not provide for use of any existing or future credits. Since the Ozone Maintenance Plan has this growth margin for industrial sources, emission reduction credits are not needed until

the growth margin is used up and the rules require offsets once again. Since SWCAA rarely has new major sources, this may not occur until after the full 20 year Maintenance Plan time period. If a major source did need offsets, they currently would not be able to use the VOC credits in the existing banks since they are not federally enforceable. Also, even if EPA approves the SWCAA credit bank, there are only enough VOC credits in the public VOC bank for one new major source to use.

Due to the above problems with the bank, the following actions were proposed in 1998 to correct identified deficiencies in the existing emission credits banking program:

- Dissolve and close the public VOC and PM credit bank. SWCAA should reconcile the public VOC and PM credit bank in a manner that results in the least burden on sources and the Agency. SWCAA would propose that any source that has been assigned credits from either the SWCAA bank or the Port of Vancouver be allowed to retain those emission credits as part of their facility emission limit. No additional paperwork would be necessary on the part of the individual sources to ensure that the current emission limits include these previously issued credits. For those credits that are not assigned to industry by SWCAA or the Port of Vancouver prior to July 1996, they would be dissolved and the bank closed.

- Retain the private VOC, PM, CO and NO_x bank and run according to SWCAA regulations; i.e., credits expire five years after issuance of order or expiration date in ERC Order.

- Revise the rules to be consistent with the federal rules and obtain EPA approval of the private credit bank program, so that if offsets become required again, the private credits can be used. Otherwise, there may not be a need for the banks if one could only use credits that had been approved in the SIP.

- Revise rules to allow the ability for future interstate emission trading. Other states and agencies will have to revise their own rules to accommodate interstate trading issues; other states and agencies have not shown great interest however. The Oregon Department of Environmental Quality has stated they could approve an interstate transfer on a case-by-case basis using a source-specific SIP revision.

The SWCAA Board of Directors approved board Resolution 1998-9 at the October 15, 1998 board meeting. The Resolution 1998-9, in conjunction with proposed changes (at that time) in SWCAA regulations 400-130, 400-131, and 400-136, dissolved the public portion of the ERC bank which contained credits from Resolution 1988-3 as superseded by Resolution 1989-3. These actual changes were not finalized until the total SWCAA 400 regulations were adopted by the Board of Directors in 1999.

As of December 31, 2004, the bank balances were as follows:

Public VOC bank	dissolved
Private VOC bank	16.68 tons/yr.
Public PM bank	dissolved
Private PM bank	0 tons/yr.
Public CO bank	dissolved
Private CO bank	0 tons/yr.
Public NO_x bank	dissolved
Private NO_x bank	0 tons/yr.

Air Quality in Southwest Washington

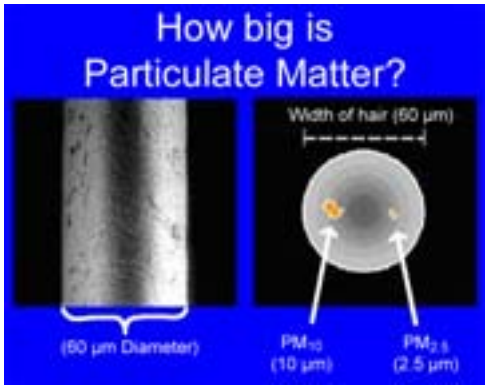
In the early 1970s the U.S. EPA established National Ambient Air Quality Standards (NAAQS) to define levels of air quality that protect the public health and welfare from the known adverse effects of air pollutants. Southwest Washington's air pollution control strategies have been directed to meet the more stringent primary air quality standards. Pollutants for which standards have been set to protect human health are termed criteria pollutants. These standards are shown in the table to the right.

Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Standard	State Standard
PM_{10}	Annual	50 µg/m^3	50 µg/m^3
	24 hours	150 µg/m^3	150 µg/m^3
$PM_{2.5}$	Annual	15 µg/m^3	----------
	24 hours	65 µg/m^3	----------
Ozone	1 hour	0.12 ppm	0.12 ppm
	8 hour	0.08 ppm	----------
Carbon Monoxide	1 hour	35 ppm	35 ppm
	8 hour	9 ppm	9 ppm
Sulfur Dioxide	Annual	0.03 ppm	0.02 ppm
	24 hour	0.14 ppm	0.10 ppm
	3 hour	0.5 ppm	0.5 ppm
Nitrogen Dioxide	Annual	0.053 ppm	0.053 ppm
Lead	Calendar Quarter	1.5 µg/m^3	1.5 µg/m^3

Particulate Matter

Particulate matter comes from both natural and anthropogenic sources. Nature provides particulate matter in a variety of forms including spores, pollen, volcanic ash, salt, soil and meteoric dust. To this natural background, humans add engine exhaust, smoke, fly ash, iron oxide, cement and countless other materials from automotive and industrial activities.



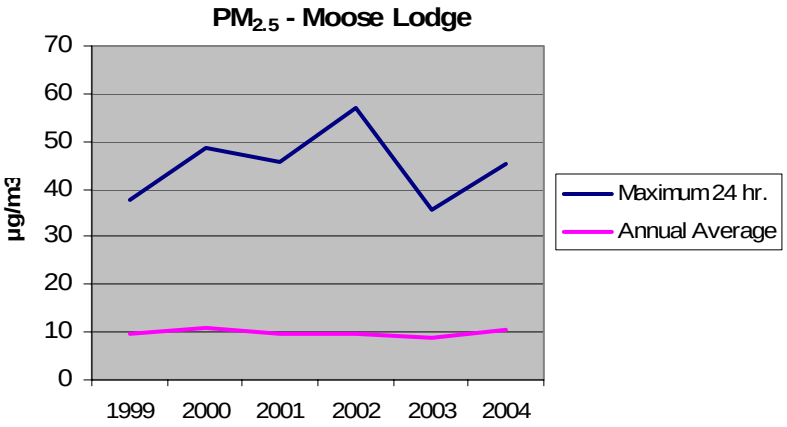
Airborne particulate matter generally ranges from 0.005 to 250 microns in diameter. Particles of this size range may remain in the air anywhere from a few seconds to several months. Gravitational settling comprises the main mechanism by which particles are removed from the air. Rain also removes particles from the air, but its effectiveness decreases with particle size and is relatively ineffective on particles smaller than 2 or 3 microns ($PM_{2.5}$).

Fine particulate air pollution consists of solid particles or liquid droplets that are 10 microns or less in diameter (PM_{10}). Part of this group includes particles of 2.5 microns or less in diameter ($PM_{2.5}$). Particles in this size range are of great concern because they can be inhaled past the nose and mouth and may penetrate deeply into the lung tissue where they can remain for years. The health effects of particulate matter vary with the size, concentration, and chemical composition of the particles. In general, particulate matter may cause health problems in three ways:

1. The particles may be inherently toxic because of their chemistry.
2. The particles may mechanically damage the respiratory system.
3. The particles may be carriers for absorbed toxic substances.

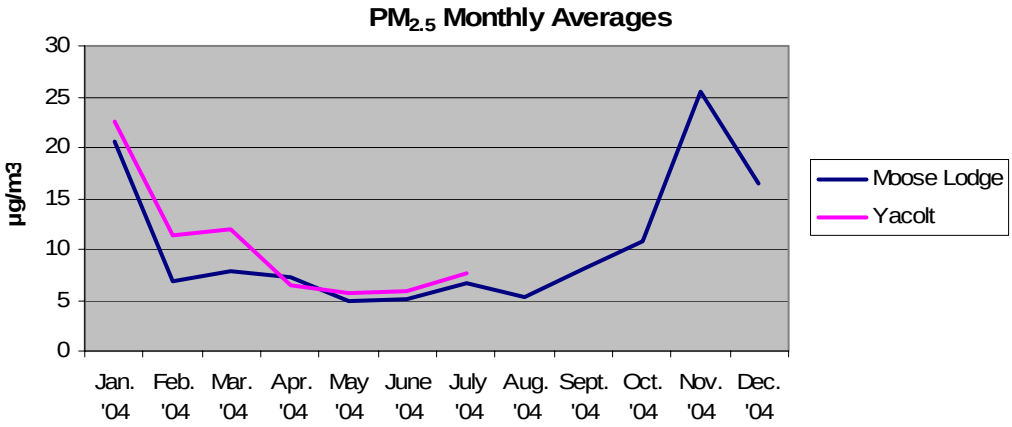
Research has demonstrated a relationship between exposure to high concentrations of particulate matter and increased hospital admissions for respiratory infections, heart disease, bronchitis, asthma, emphysema and other conditions. In addition, there may be several potential carcinogens

present in particulate matter. Of particular concern are the condensed heavy organic compounds released from low temperature combustion processes (such as wood stoves and burn barrels).

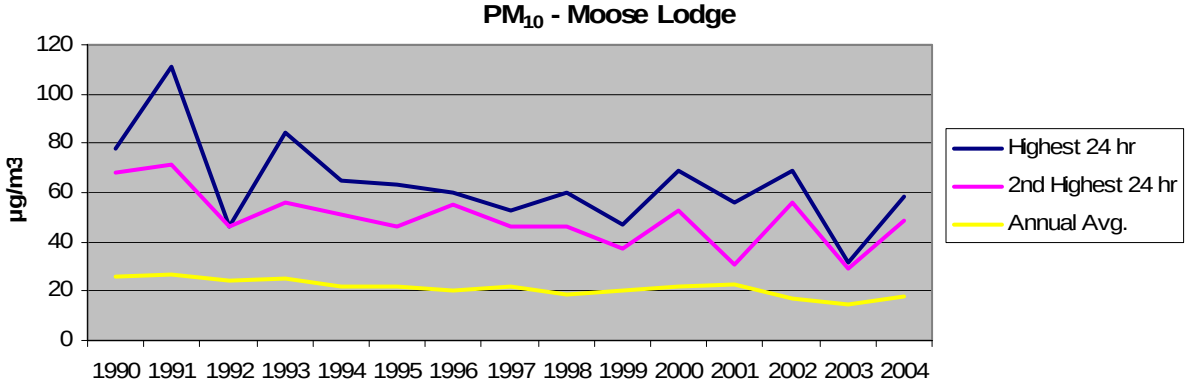


Particulate matter constitutes a large fraction of the pollutants in the air and often is the most hazardous to human health and welfare. Effects of total suspended particles on animals, materials and vegetation are related to the chemical composition and physical state of the particulate matter. The effects on human health are primarily associated with injuries to the respiratory system. Particles smaller than 10 microns (PM_{10}) can easily reach the bronchial passage, while those with diameters less than 2.5 microns ($PM_{2.5}$) can reach the deepest portions of the lung. Fine particles are also associated with burning and irritated eyes, surface soiling, and degradation of visibility and materials. The trends in control of particulate matter include high efficiency filters, control of precursor gases that may form particles in the atmosphere, and cleaner fuels.

Among the most obvious effects of fine particles are reductions in insolation and visibility due to absorption and scattering of light by suspended fine particles. Virtually all smoke particles from residential wood stoves and fireplaces, industrial boilers, field burning, and other combustion processes can be characterized as PM_{10}, and the vast majority as $PM_{2.5}$.



The Southwest Clean Air Agency has continued to monitor PM_{10} and $PM_{2.5}$ at Moose Lodge in Vancouver through 2004. The temporary $PM_{2.5}$ monitor located in Yacolt was discontinued in July of 2004. The above graph demonstrates how particulate matter is more of a wintertime pollutant.

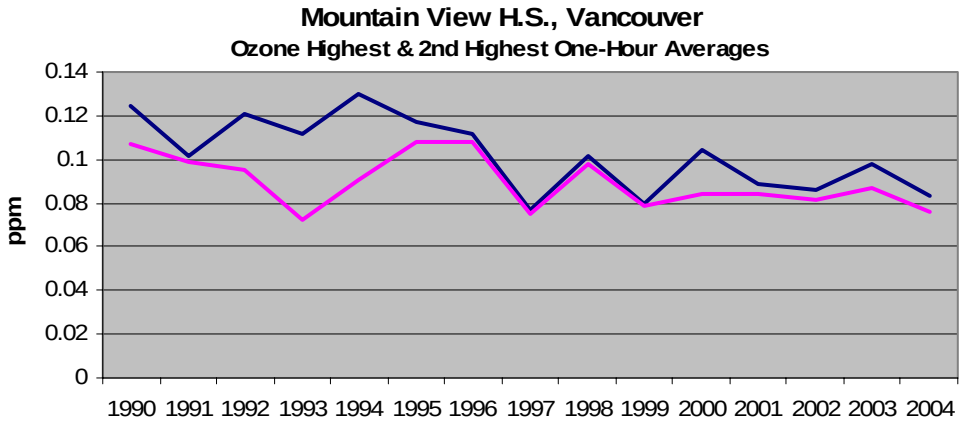


Ozone

Ozone is a pungent, toxic, highly-reactive form of oxygen that is a major component in smog. Ozone is not emitted directly into the air. It is formed through a series of photochemical (sunlight-requiring) reactions between other pollutants and oxygen (O_2). Most important of these are nitrogen oxides (NO_x) and volatile organic compounds (VOC). To control ozone pollution, it is most common to control both NO_x and VOC. Detailed monitoring and modeling studies are required to justify focusing on only one or the other of these two pollutants.

The “ozone layer” in the stratosphere should not be confused with the ozone in the air we breathe at ground level. Stratospheric ozone is formed by the ionization of the upper levels of the atmosphere and provides protection from the sun’s harmful ultraviolet radiation.

In humans, ozone acts as a mucous pulmonary irritant resulting in impaired respiratory functions. Ozone impairs the normal function of the lungs and at higher concentrations (between 0.15 and 0.25 ppm), causes lung tightness, coughing and wheezing. Particularly susceptible to the effects of ozone are young children, the elderly, people with respiratory ailments and individuals who exercise vigorously.



Plants can also be affected by exposure to high ozone levels, as evidenced by reductions in growth and crop yield. High concentrations of ozone also affect vegetation, resulting in leaf damage and/or reductions in crop growth and yield. Ozone also degrades rubber, textiles, paint, and many similar polymeric and natural materials.

The highest ozone levels occur on hot summer afternoons, since ozone forms as the sun heats up the air during the day. Strong sunlight alone is not the cause of ozone. Even with high temperatures and sunlight, ozone levels would be low without the nitrogen oxides and VOC pollutants emitted from activities like driving and using gas-powered lawn and garden equipment.

The federal ozone standard is an eight-hour average value of 0.08 ppm (parts of ozone per million parts of air) or 100 on the Air Quality Index (AQI). This standard was recently revised by the U.S. Environmental Protection Agency after extensive research on the health effects of ozone pollution. U.S. EPA established the new standard in September 1997.

It is important to understand that the areas of Vancouver, Washington and Portland, Oregon share the same airshed. This area is commonly referred to as the “Portland-Vancouver Interstate Air Quality Maintenance Area” (AQMA). In this situation, the consequences of a violation of the federal ambient air quality standards in either state are shared equally by both states. Because it takes several hours to produce peak levels of ozone through the chemical reactions with VOCs, NO_x and sunlight, a recorded exceedance of ozone may be a significant distance from the sources that

released the corresponding VOC and NO_x precursor emissions. See Appendix B for a local history of air pollution exceedances.

In the summertime when air becomes stagnant and temperatures rise into the 90s, the Southwest Clean Air Agency and the Oregon Department of Environmental Quality sometimes declare a Clean Air Action Day. On these days, we ask people to carpool or use alternative forms of transportation, avoid using gas-powered lawn mowers or aerosol sprays to decrease the emissions of pollutants that react to form ozone.

The ozone trend in the Vancouver area shows some overall improvement. In 1998 SWCAA recorded three exceedances of the federal ozone standard in the greater Portland area, though there have been no exceedances since due to favorable weather patterns.

Volatile Organic Compounds

The relationship between volatile organic compounds (VOCs) and ambient ozone levels is not a simple one. This is largely because of the complex nature of ozone formation and its dependence on sunlight, temperature and atmospheric mixing. Generally, the ozone-forming potential of an airshed increases with increasing VOC and NO_x emissions.

Volatile organic compounds are a large family of compounds made up of primarily hydrogen and carbon. These compounds are instrumental in the complex series of reactions leading to the formation of ozone and photochemical smog. VOC emissions are mainly from motor vehicles, fuel evaporation, paints and industrial coatings, and combustion processes.

Emission inventories since 1999 have shown decreases in VOC emissions in southwest Washington, though this may change due to population growth. Major reductions in VOC emissions have been achieved through automotive and industrial emission controls. Future reductions will come from Vancouver's vehicle inspection and maintenance program and local transportation control strategies, even as traffic volumes continue to increase significantly. Stage II gasoline vapor recovery equipment and improved controls on gasoline dispensing facilities have led to further VOC emission reductions.

Carbon Monoxide

Carbon monoxide (CO) is a colorless, odorless, poisonous gas. In the body, CO binds tightly to hemoglobin (the red pigment in blood that transports oxygen from the lungs to the rest of the body). Once hemoglobin is bound to CO, it can no longer carry oxygen. In this way, CO reduces the oxygen-carrying capacity of the blood and can result in adverse health effects.

High concentrations of CO strongly impair the functions of oxygen-dependent tissues, including the brain, heart, and muscles. Prolonged exposure to low levels of CO aggravates existing conditions in people with heart disease or circulatory disorders. There is a correlation between CO exposure and increased hospitalization and death among such patients. Even in otherwise healthy adults, carbon monoxide has been linked to increased heart disease, decreased athletic performance, and diminished mental capacity.

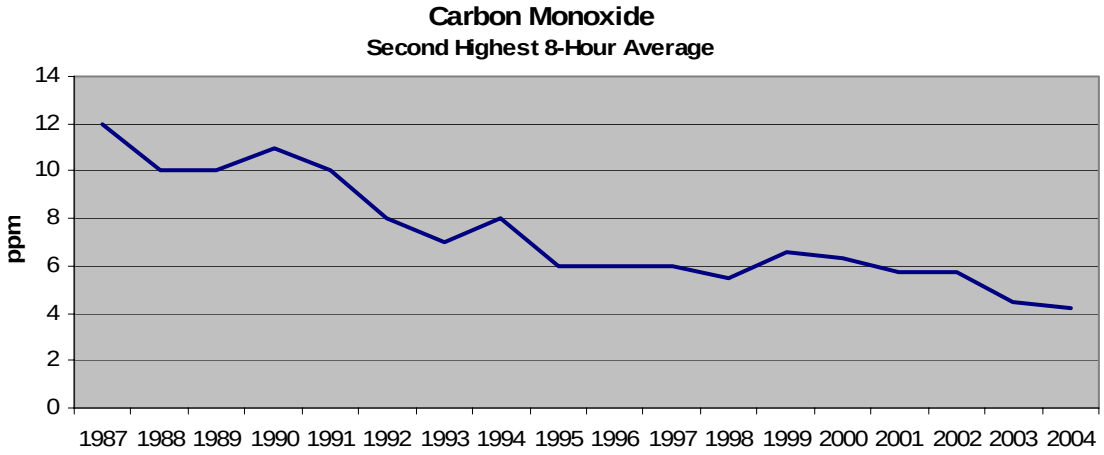
Carbon monoxide also affects newborn and unborn children. High CO levels have been associated with low birth weights and increased infant mortality. Even healthy individuals can be affected at relatively low carbon monoxide concentrations, temporarily resulting in impaired mental functions, visual acuity and alertness.

Another potential danger of carbon monoxide is its association with cigarette smoke. This habit can inactivate a smoker's hemoglobin even further, causing a greater exposure to carbon monoxide

when combined with external air pollution. Because of its unique mode of action, carbon monoxide is not known to have adverse effects on vegetation, visibility or material objects.

A major natural source of CO is spontaneous oxidation of naturally occurring methane (swamp gas). The major human caused source is incomplete combustion of carbon-based fuels. This is primarily from gasoline-powered motor vehicles. Other important sources are wood stoves, outdoor burning and fuel combustion in industrial and utility boilers.

Carbon monoxide emissions from motor vehicles are highest during cold starts. This is one reason why it is best to have alternative transportation modes available that never requires that the vehicle be started in the first place. How a motor vehicle is operated also has an effect on the amount of CO emitted. In stop-and-go driving conditions, CO emissions are also increased when the outside temperature is low. Southwest Washington's most serious CO problems occur during the winter in urban areas, when CO emitted by slow-moving traffic is trapped near the ground.



Trends indicate a gradual reduction in ambient levels of carbon monoxide (CO) in the Vancouver/Portland area. Because CO accumulation is so dependent on weather conditions and patterns, trends of this nature should be viewed with cautious optimism. The carbon monoxide standard is violated when more than one exceedance of the 9 ppm eight-hour average occurs in a calendar year. During 1987 the Vancouver sampling site experienced four exceedances of the eight-hour standard. In 1992 and 1993, there were no exceedances recorded, but one exceedance was recorded in January 1994. None were recorded since, until January 10, 1999 when an exceedance was recorded at the Atlas & Cox site in Vancouver. Because this was the only exceedance in 1999 it did not result in a violation of the federal standard. There have been no CO exceedances since then in the Vancouver area.

The federal Clean Air Act Amendments of 1990 passed by Congress required that carbon monoxide attainment be reached by December 31, 1995 in order for Southern Clark County to avoid sanctions from the U.S. Environmental Protection Agency. Southern Clark County had not violated the carbon monoxide health standards for three consecutive years and only exceeded the standards once in 1994, making it eligible to request redesignation. A technical advisory committee, made up of interested individuals from the community, was formed for this endeavor in early 1994 and worked throughout that year and 1995 on a 10-year Maintenance Plan for the region. The redesignation request provided for the removal of the oxygenated fuel program upon EPA approval of the plan. This was done because projections indicated that the carbon monoxide emission reductions from the vehicle fleet and maintenance programs would keep the area in attainment. This proposal was adopted by SWCAA's Board of Directors on December 19, 1995, and a state implementation plan (SIP) hearing was held on January 30, 1996. Redesignation was approved by the EPA in October of 1996 and the use of oxygenated fuel was discontinued in November of 1996.

SWCAA continues to operate according to the terms of the Carbon Monoxide Maintenance Plan (See Appendix A).

Because carbon monoxide pollution is strongly influenced by motor vehicle emissions, control strategies have focused on the federal Motor Vehicle Emission Control Program. Automobile manufacturers responded to this program by equipping most vehicles that were built after 1974 with catalytic converters and other emission control features. EPA began to tighten emission standards in 1981 on automobiles and with the adoption of the federal Clean Air Act of 1990 the emission levels were further reduced.

Vancouver's carbon monoxide control strategy includes an Inspection and Maintenance (I&M) Program operated under the auspices of the WDOE. This program began in June of 1993 and requires automobiles registered within the carbon monoxide non-attainment area to be inspected bi-annually prior to license renewal. As provided by the Agency's Ozone Maintenance Plan the I&M testing has been expanded into the Ridgefield, Battle Ground, Brush Prairie and LaCenter areas.

Nitrogen Dioxide

Nitrogen dioxide (NO_2) is a reddish-brown gas that is toxic in high concentrations. It is a lung irritant and may be related to chronic pulmonary fibrosis. It is also important in the photochemical reactions leading to the formation of ozone. It can cause indirect damage to materials when it combines with moisture in the air to form nitric acid. The nitric acid can then cause corrosion of metal surfaces and can also contribute to acid rain. In addition, NO_2 absorbs visible light and reduces visibility. It has also been linked to suppressed growth rates in some plants. Air is composed approximately of 78 percent nitrogen and 21 percent oxygen. Together, these predominant gases constitute up to 99 percent of our atmosphere by volume. When combustion occurs at high temperatures such as in automobile engines and in power plants, nitrogen may combine with oxygen to form several different gaseous compounds collectively known as oxides of nitrogen (NO_x). Of these, nitrogen dioxide (NO_2) and nitric oxide (NO) are the most common and important from an air pollution standpoint.

Both NO_2 and NO are potential health hazards. NO is not considered a direct health threat because of the low concentrations found in our atmosphere. The threat NO poses is its ability to react in the atmosphere to form the more toxic compound NO_2. Nitrogen dioxide is a pulmonary irritant affecting primarily the upper respiratory tract. Although four times more toxic than nitric oxide, NO_2 rarely produces even the mildest of effects. The main harm most people experience is not from nitrogen oxides directly, but rather from a reaction NO_x has with hydrocarbons in sunlight to produce the photochemical oxidants, ozone and smog.

Nitrogen dioxide also reacts with moisture in the atmosphere to form nitric acid, a contributor to acid rain, which even in small concentrations can corrode metal surfaces. It has adverse effects on atmospheric visibility and vegetation, although these effects are more commonly found in the Northeastern U.S. than in southwest Washington. In addition, nitrogen oxides and their reaction products have been linked to stress corrosion failures of nickel-brass alloys, and to the damaging of fabrics and dyes.

The major man-made source of NO_2 is fuel combustion in motor vehicles, and utility and industrial boilers. Nitric oxide (NO) is the major nitrogen oxide produced during the combustion process, but once in the atmosphere, NO is rapidly oxidized to NO_2 in the presence of ozone.

Sulfur Dioxide

Sulfur Dioxide (SO_2) is a colorless, pungent, nonflammable gas. In the body it acts as a lung and eye irritant. When SO_2 is inhaled it causes bronchial constriction, which results in breathing difficulty and an increase in pulse and respiratory rate. People with respiratory diseases like asthma, bronchitis, or emphysema are particularly susceptible to the effects of SO_2.

When conditions promoting the oxidation of SO_2 to sulfuric acid are present, the irritant response of SO_2 increases in magnitude by a factor of two to three. When sulfuric acid is inhaled, mucous production increases. This reduces the respiratory system's ability to remove particulate matter, and can lead to more severe respiratory infections, such as pneumonia. Chronic exposure to SO_2 can lead to coughs, shortness of breath, fatigue, and bronchitis. Healthy individuals may experience abnormal breathing due to airway resistance. Studies indicate hourly SO_2 concentrations of 250 parts per billion (ppb) have been known to cause bronchial-constriction in asthmatics and sensitive individuals. Other cases show sulfuric acid formation in the lower respiratory tract as a direct result of SO_2 absorption onto particulate inhalants. SO_2 can also damage plants and building materials. The leaves of some vegetables (spinach and lettuce, for example) are damaged by exposure to high levels of SO_2. Sulfur oxides (SO_X) accelerate corrosion of metals and other building materials (e.g. limestone, marble, mortar) by forming sulfuric acid on the surface of the material, or in the atmosphere with subsequent deposition on the material. In addition, sulfuric acid and sulfate particles formed in the atmosphere from SO_2 can cause scattering of visible light, thus contributing to haze and visibility degradation. These same processes can contribute to acid rain and lead to acidification of lakes and soils.

SO_2 is emitted into the atmosphere through the combustion of sulfur-containing fossil fuels, such as diesel or coal. At concentrations above three parts per million (ppm), it can be distinguished by its pungent and irritating odor. In the United States, more than half of the SO_2 pollution originates from power plants. When SO_2 leaves a smoke stack, it may oxidize in the plume to form sulfur trioxide, a highly reactive colorless gas, which combines rapidly with water vapor to form sulfuric acid. This sulfuric acid may further react to form sulfates that, if carried by the wind, may fall miles from the source as acid rain. This explains how coal-fired power plants contribute to acid rain problems on the East Coast.

Coal is the primary fuel for most electricity producing power plants. Because coal contains 0.2 percent to 7.0 percent sulfur, its removal presents a serious air pollution need. Early removal of sulfur occurs from some fossil fuels, such as natural gas and petroleum, while still in a gaseous or liquid state. This technology is not easily transferred to sulfur-containing solids. The technology used by industry today involves "coal washing," a method by which the sulfur content in coal is partially reduced before combustion. In addition to this practice, SO_2 emissions can be controlled by other means. These include scrubbing of stack gases, flue gas desulfurization, and the burning of low sulfur coal and oil.

Lead

Lead (Pb) is a toxic heavy metal, abundant in the earth's crust. Airborne lead particles are small in size (less than one micron). For this reason, they can penetrate deep within the lungs and ultimately be absorbed into the human bloodstream. High concentrations of lead in the blood can cause severe and permanent brain damage, especially in children. Lower levels have vague, non-specific symptoms, including headaches, malaise, stomach pain, irritability, and pallor. Damage can be caused to the heart, kidney, liver, and nerve and blood tissues.

Exposure to lead can occur through multiple pathways, including inhalation of air, ingestion of lead in food, water, soil or dust. Because airborne lead particles are small in size (generally less than

one micron), a large amount may be inhaled and deposited in the lungs throughout a lifetime. Three systems in the body appear to be sensitive to lead interference: the blood forming system, the nervous system and the renal (kidneys) system. Excessive lead exposure can cause seizures, mental retardation and/or behavior disorders. Fetuses, infants and children are especially susceptible because adverse effects usually occur at lower lead levels than found in the average adult resulting in central nervous system damage. In addition, children are at a greater risk through everyday contact with dust and soil. Streets, playgrounds and the normal hand-to-mouth activities of a child can ultimately lead to high lead exposures. Studies have also shown that lead may be a factor in high blood pressure and subsequent heart disease in middle-aged white males.

The major source of lead in the air was the combustion of leaded gasoline in automobiles. This one source accounted for close to 90 percent of the total emissions in the U.S. annually. The U.S. ban on leaded gasoline, effective December 31, 1995, sharply reduced lead contamination in our airshed.

Indoor Air Quality

Indoors was traditionally thought to be a haven from air pollution, but recent studies indicate that air in the work place and home may be as polluted as or worse than the outdoors. In modern times, the use of synthetic building materials and fabrics has become commonplace. After World War II, traditional building materials such as wood were replaced with cheaper alternative materials that could be produced and processed on a large scale. New products such as plastics and pressed-wood products were introduced as materials for building construction and furnishings.

An explosion also occurred in the development of personal care products, pesticides, and household cleaners. Relatively simple and less toxic household cleaners such as baking soda, vinegar, soap, and lye solutions were replaced by more sophisticated chemical formulations. These consumer products were increasingly packaged in convenient aerosol cans, which released their contents directly into the indoor air.

During the energy crisis of 1974, the nation focused on conserving energy in homes and other buildings. The desire to reduce heating and cooling costs led to changes in construction techniques in both residential and commercial buildings, which reduced building ventilation rates. These changes included tighter buildings; inoperable windows; decreased use of operable windows in older construction; use of sealant foams and vapor barriers; reductions in the amount of outdoor air used for ventilation; improperly sized and designed heating, ventilating, and air conditioning (HVAC) systems; the renovation of existing buildings (without corresponding changes to the HVAC systems); and inadequate building maintenance. All of these developments have had two basic effects: an increase in the number and type of contaminants released into the indoor environment, and a decrease in the amount of fresh outdoor air that is introduced into structures to dilute contaminants and satisfy the health and comfort needs of occupants. Increased insulation in buildings and changes in acceptable operating temperatures increased energy efficiency, but also resulted in tight buildings that retained moisture and other contaminants and provided a more favorable environment for microbial growth.

Common indoor air pollutants include:

- Combustion products such as particulates (ash), CO and NO_2 from tobacco smoking and improper operation of gas appliances, fireplaces, wood stoves, and space heaters.
- Formaldehyde from new home materials like carpet, upholstery, and wood products.
- Vapors from paints, solvents, and aerosols.

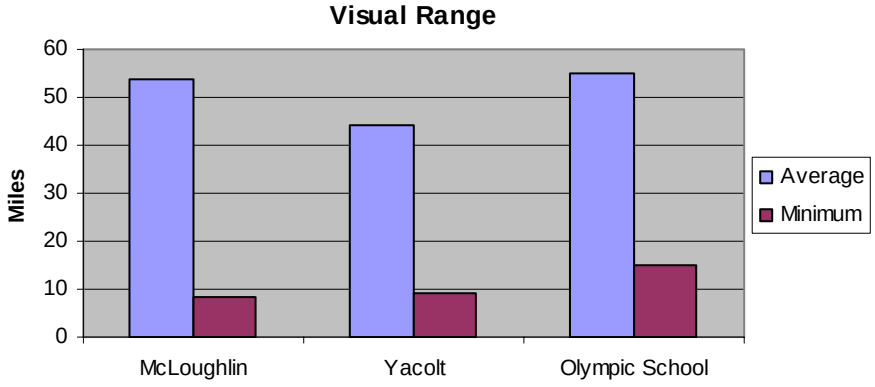
- Pesticide and herbicide residues.
- Asbestos, found in older home products like ceiling tiles, flooring, dry wall and insulation.
- Biological contaminants such as bacteria, mold, mildew, and pollen.
- Radon, a radioactive gas caused by the natural breakdown of uranium. Radon can be found in high concentration in soils and rocks containing uranium, granite, shale phosphates, and pitchblende.
- Particulates from humidifiers using tap water.

Currently, SWCAA's enforcement authority is limited to outdoor air pollution. However, since indoor air is a significant concern, SWCAA will provide indoor air guidance on request, as resources are available.

Visibility

Although protecting public health is the primary mission of the agency, the Cascade scenery and panoramic vistas are also considered important elements of the high quality of life in the Northwest. Fine particulate air pollution, particularly $PM_{2.5}$, at concentrations well below the health-based standards can cause visibility impairment by scattering visible light and reducing visual range. SWCAA began a monitoring effort in late 1998 to also measure and document the change of visibility (i.e., scenic panoramas) from the Vancouver/Portland area. In November 1998 a 35-millimeter camera was installed on top of the Smith Tower in downtown Vancouver to take daily photographs of Mount Hood. These pictures allow for a qualitative assessment of visibility. In 2003 the camera was replaced with a digital camera to provide images with better quality more frequently and reliably. The second phase of this project involved installing an integrating nephelometer on the roof of McLoughin Middle School in the camera's view path looking towards Mount Hood. This instrument provides a quantitative measure of light scattering caused by dry fine particulate pollution in the atmosphere. The nephelometer began operating in June of 1999 and, aside from maintenance and unscheduled downtime, operates continuously.

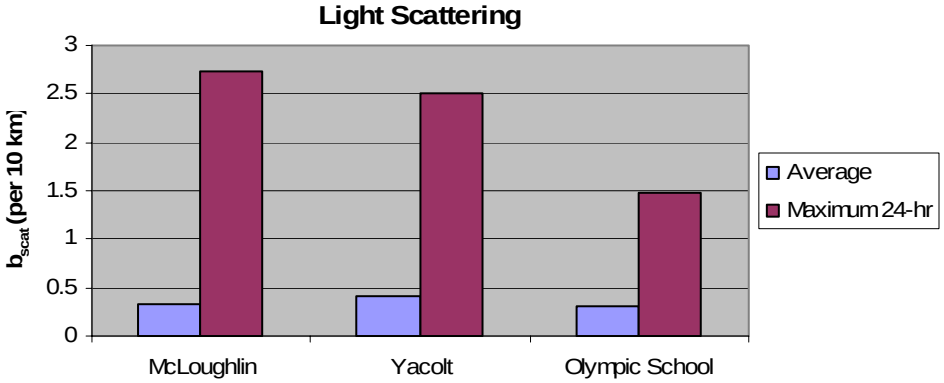
Visibility is often explained in terms of visual range and light extinction. Visual range is the maximum distance – usually miles or kilometers – that you can see a black object against the horizon. Light extinction is the sum of light scattering and light absorption by fine particles and gases in the atmosphere. The more light extinction you have, the shorter your visual range will be.



Reduced visibility (or visual range) is caused by weather (clouds, fog, and rain) and air pollution (fine particles and gases). The major pollution contributor is fine particulate matter ($PM_{2.5}$) emissions, which are transported aloft and may remain suspended for a week or longer. Fine particles seem to have a greater impact than coarse particles at locations far from the emitting source(s) because they remain suspended in the atmosphere longer and travel farther.

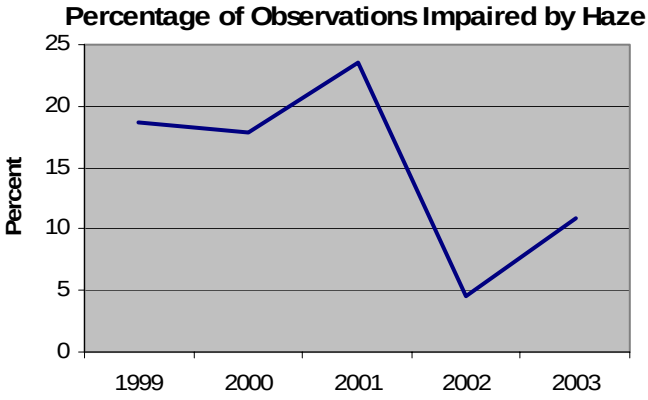
Light extinction measurement is a scientific method of characterizing visibility. An integrating nephelometer is used to measure light extinction caused by particulate pollution. The nephelometer

continuously measures light scattering, the main cause of light extinction. The instrument is calibrated to yield an output termed b_{scat}, expressed in units of scattering per 10 kilometers of sighting distance. The instrument has a heated sample inlet to eliminate water vapor, and measure only scattering due to dry particle pollution. By measuring light scattering this way, reproducible, real-time data is obtained that can be used for evaluating pollution control strategies and analyzing trends.



Nephelometers only measure light scattering at the locale of the monitoring site and may not accurately represent pollution and weather variations over the entire range to a distant viewpoint. However, we believe that the visual ranges derived from the McLaughlin Middle School nephelometer in Vancouver are representative of visibility in the communities surrounding the monitoring site.

The bar graphs in this section indicate light scattering and visual range information for each of the sites monitored by nephelometer in calendar year 2004. Since light scattering and light extinction are not familiar terms, some comparisons may be useful for relating the Vancouver results. According to visibility trends data developed by the National Park Service, the Great Basin, central Rocky Mountains, and non-urban areas in the Southwest United States exhibit the lowest light extinction levels, averaging 0.1 to 0.15 per 10 km (162 to 242 mi. visual range). The highest levels occur in the eastern United States, averaging as high as 1.2 to 1.3 per 10 km (18 to 20 mi. visual range) in some places.



The percentage of days with impaired visibility due to haze in the Vancouver urban area is shown in the adjacent graph. This information is relatively subjective compared with the visual range and light scattering data derived from the nephelometer outputs. The percentage of days impaired by haze was derived from review and codification of photographs taken from the Smith Tower camera. Visibility data for 2004 was omitted from the adjacent graph because the data collected was inconclusive.

Appendix A

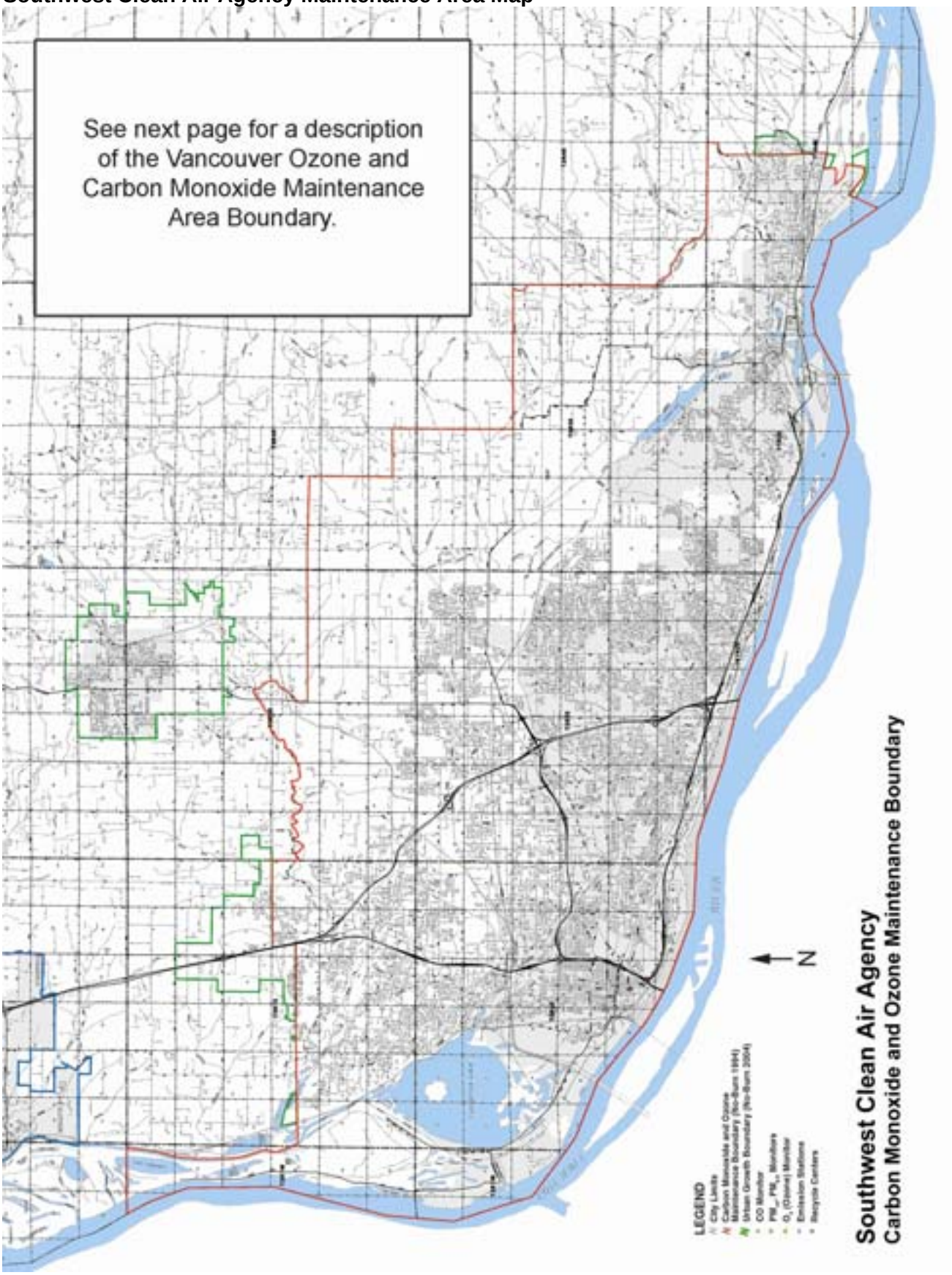
Carbon Monoxide and Ozone Maintenance Plans

By the end of April 1997 the Portland/Vancouver area was redesignated to “attainment” status for carbon monoxide and for ground level ozone. For the few years prior, the area had met the standards for these pollutants and was able to apply to the U.S. EPA for redesignation to “attainment” status. In order to do this, SWCAA was required to submit a 10-year Maintenance Plan for both pollutants. A committee of community representatives, including business owners and concerned citizens, was established to help guide the development of these plans. The first meeting of the Maintenance Plan Technical Advisory Committee (TAC) was in February of 1994. The TAC met monthly throughout a 1 1/2-year period to discuss and evaluate potential control measures. Each control strategy was evaluated for its cost effectiveness as well as its ability to ensure no further violations of the National Ambient Air Quality Standards (NAAQS). These meetings concluded in the fall of 1995 after the development of the final recommendations. On December 19, 1995, the SWCAA Board of Directors adopted the carbon monoxide plan, which provided for the removal of the oxygenated fuels program on the EPA approval date. Redesignation to attainment status was then granted in October 1996. The plan also requires a carbon monoxide (CO) saturation study every four years in the Vancouver maintenance area to ensure that the permanent monitors are appropriately located to record “worse case” CO concentrations for the area. The saturation study for the 1998/1999 winter was initiated in October 1998 and sampling was completed in February of 1999. Results of the study confirmed proper location of the Atlas & Cox and the Hazel Dell monitors. The Hazel Dell monitor was discontinued in 2001 due to a long history of low concentrations relative to Atlas & Cox.

The Ozone Maintenance Plan was adopted early in 1996. This plan called for expansion of the existing vehicle inspection and maintenance program and enhanced testing. The plan also required the TAC to review any exceedances that may occur over the term of the plan and report their recommendations, including any corrective measures. The TAC reconvened in December of 1996 to begin review of the exceedance of the ozone standard that occurred in Portland during the 1996 ozone season. Following the TAC review and recommendations, the redesignation to attainment status for ozone was granted in April of 1997. During the summer of 1998 there were four exceedances of the one-hour standard in the Portland area, three of which were at one site. These exceedances, in combination with the 1996 exceedance would normally have constituted a violation of the one-hour ozone standard and triggered the appropriate responses defined in the maintenance plan. But this did not occur because the one-hour standard had just been replaced by the new eight-hour standard, which was not violated by these exceedances. However, in May of 1999, the DC Circuit Court of Appeals remanded the new eight-hour ozone standard (along with the new $PM_{2.5}$ standard) in response to a special interest appeal challenging EPA’s authority to implement the new standards. Following a failed petition to the Court of Appeals for rehearing, the EPA successfully petitioned the U.S. Supreme Court to review the underlying issues. The new standards have since been upheld (effective March 26, 2002), but, in the meantime, the EPA had moved to reinstate the old one-hour standard, effective October 18, 2000. This caused a violation for the three-year period from 1996 through 1998 based on the series of exceedances described above. SWCAA and the Oregon Department of Environmental Quality (DEQ) negotiated with EPA Region 10 to determine that contingency measures in the Ozone Maintenance Plan need not be implemented as a result of this “retroactive” violation. There have been no exceedances in the Portland/Vancouver area of the one-hour or eight-hour ozone standard since 1998.

Both the carbon monoxide and the ozone maintenance plans are approaching their 10-year expiration terms. SWCAA, in cooperation with the Oregon DEQ and Washington State University, began work in 2003 on the new maintenance plans for the coming 10-year term.

Southwest Clean Air Agency Maintenance Area Map



Description of the Vancouver Ozone and Carbon Monoxide Maintenance Area Boundary

The ozone and carbon monoxide maintenance area boundary description begins at the northwest corner at the intersection of the section line on the south side of Section 36 of T4N.R1W and the north side of Section 1 of T3N.R1W. The boundary turns southward following the east shores of Lake River, until it would intersect with the 14900 block NW, then easterly to join with NW 149th Street. This boundary runs until it meets the western edge of Interstate 5, then north to 159th Street and east on 159th Street to the east side of NE 50th Avenue. On 50th Avenue the boundary runs south until it joins the south bank of Salmon Creek, following the south branch of the creek until it reaches NE Caples Road, then southerly on the west side of Caples Road (currently SR-502) until it intersects with NE 144th Street. The boundary continues eastward along the south side of NE 144th Street following the 14400 block plane to where it would join with the west side of NE 212 Avenue, then southward to the south side of NE 109th Street. The boundary continues east on NE 109th Street, then southerly along the west side of NE 232 Avenue to where the 23200 block joins with the northern edge of NE 58th Street. The boundary continues east on NE 58th Street until the 5800 block intersects with the western edge of Livingston Road. The boundary follows Livingston Road South until it turns into NE 292nd Avenue. Staying on the plane of the 29200 block, the boundary proceeds south until it joins SE Blair Road. The boundary follows along the south-west side of Blair Road south-eastward to its intersection with Washougal River Road. The boundary proceeds eastward at the northern edge of the 2000 block to SE 20th Street. The boundary continues east on SE 20th Street until it intersects the western edge of SE Jennings Road (352nd Avenue), then south along the 4900 plane to SE 49th Avenue. The boundary follows the 4900 plane south until it intersects Evergreen Boulevard (the eastern edge of current Washougal City limits). The boundary continues south along the Washougal City limits to the State border along the section line on the west side of Section 21 of T1N.R4E. The boundary follows the Clark County line (State boundary) down the Columbia River until it connects at the northwest corner of the boundary at the section line of Section 36 of T4N.R1W and the north side of Section 1 of T3N.R1W.

Note: The Columbia River is the common boundary shared by Washington and Oregon for the Portland-Vancouver carbon monoxide and ozone non-attainment area.

Appendix B

Exceedances of Standards

The following table indicates the number of days in each of the past 25 years that southwest Washington and the Portland/Vancouver Air Quality Maintenance Area (AQMA) experienced pollution concentrations above the NAAQS levels. An exceedance day occurs if any monitoring site records one or more values above these standards during the midnight-to-midnight period. However, an exceedance does not necessarily constitute a violation.

Number of Exceedance Days and the Associated Violations for the Portland/Vancouver AQMA

Pollutants and Monitoring Sites	Calendar Years (1980 through 2004)																								
	'80	'81	'82	'83	'84	'85	'86	'87	'88	'89	'90	'91	'92	'93	'94	'95	'96	'97	'98	'99	'00	'01	'02	'03	'04
Ozone (O_3)																									
Vancouver																									
Mountain View H.S.			1												1										
Portland																									
Carus		5	1	2	2		1		2		4	1	1				1		3						
Milwaukie				2		1	3	1	1								2		1						
Sauvie Island			1					1																	
Carbon Monoxide (CO)																									
Vancouver																									
Atlas & Cox	2			1	1			4	3	2	2	2			1					1					
Portland																									
Burnside	19	16	2	3																					
Sandy	12	7	3	8	2	1	1	1																	
Alder/4th	11	5	2	7	3	2		1																	
Lafayette		1	2	2																					
Postal Bldg.									1			1													
Division/82nd										2		1													
Fine Particulate (PM_{10}, $PM_{2.5}$)																									
Vancouver																									
Moose Lodge																									
Washington School																									
Longview																									
City Shops																									
Olympia School																									
Centralia Library																									
Camas City Hall																									
Stevenson																									
Vader School																									
Yacolt																									
Sulfur Dioxide (SO_2)																									
Longview																									
Camas																									
Violations triggered for the Portland/Vancouver AQMA:																									
Ozone		v	v	v	v	v	v	v	v		v	v	v						v*						
Carbon Monoxide**																									
Vancouver CO AQMA	v	v	v	v	v	v		v	v	v	v	v													
Portland CO AQMA																									

(Blank cells = 0 exceedance days; shaded cells = no monitoring conducted; * = change in the standard)

** Only one Carbon Monoxide AQMA existed prior to Nov. 28, 1995.

Appendix C

Criteria Pollutants

Criteria Pollutants			
Pollutants	**Description**	**Sources**	**Health Effects**
Particulate (PM_{10}) **Particulate ($PM_{2.5}$)**	Particles of 10 microns or less in diameter. Particles of 2.5 microns or less in diameter	Wood stove, industry, construction dust, street sand application, outdoor burning, agricultural activities.	Aggravates ailments such as bronchitis and emphysema, especially bad for those with chronic heart and lung disease, as well as the very young and old and those who are pregnant.
Carbon Monoxide (CO)	An odorless, tasteless, colorless gas that is emitted from any form of combustion.	Mobile sources (autos, trucks, buses), wood stoves, outdoor burning, industrial combustion sources.	Deprives the body of oxygen by reducing the blood's capacity to carry oxygen; causes headaches, dizziness, nausea and listlessness and in high doses may cause death.
Ozone (O_3)	Formed when nitrogen oxides and volatile organic compounds react with one another in the presence of sunlight and warm temperatures. A component of smog.	Mobile sources, industry, power plants, gasoline storage and transfer, paint, solvent usage.	Irritates eyes, nose, throat and respiratory system; especially bad for those with chronic heart and lung disease, as well as the very young and old, and those who are pregnant.
Nitrogen Dioxide (NO_2)	A poisonous gas produced when nitrogen oxide becomes a byproduct of sufficiently high-burning temperatures.	Fossil fuel power, mobile sources, industry, explosives manufacturing, fertilizer manufacturing.	Harmful to lungs, irritates bronchial and respiratory systems; increases symptoms in asthmatic patients.
Sulfur Dioxide (SO_2)	A gas or liquid resulting from the burning of sulfur-containing fuel.	Fossil fuel power plants, non-ferrous smelters, kraft pulp production.	Increases symptoms in asthmatic patients; irritates respiratory system.
Lead (Pb)	A widely used metal, which may accumulate in the body.	Leaded gasoline, smelting, battery manufacturing, and recycling.	Affects motor function, reflexes and learning; causes damage to the central nervous system, kidneys and brain. Children are affected more than adults.

Appendix D

Glossary

Air impairment: Unhealthy levels of air pollutants necessitating outdoor burning bans. SWCAA may declare air impairments based on monitored levels of pollution and weather forecasts.

Ambient air: The surrounding air (excluding indoor air).

Area source: A pollution source not confined to one point, but spread out in a large geographical area. Area sources include automobiles, wood stoves, small businesses (i.e. dry cleaners), etc.

BACT: Best Available Control Technology, or the most effective way that is technically and economically feasible to limit the amount of air pollutants emitted.

Carbon monoxide (CO): A colorless, poisonous gas formed when carbon-containing fuel is not burned completely. Sources include vehicle emissions, industry, and wood burning. Related to respiratory and heart diseases.

Class I area: All international parks, national wilderness areas and memorial parks which exceed 5,000 acres, and all national parks which exceed 6,000 acres in size.

Criteria pollutants: A category of pollutants identified by EPA for which standards for protecting human health have been set. Includes carbon monoxide, nitrogen dioxide, sulfur dioxide, ozone, particulate matter and lead.

Emission inventory: A data bank of air pollution statistics, identifying the type, size and location of various pollution sources. Categories include point sources and area sources.

Environment 2010: A strategic plan to identify and ultimately solve the environmental problems faced by Washington State both now and in the future.

EPA: Environmental Protection Agency, a federal agency responsible for environmental concerns.

Federal Clean Air Act: The first major legislation to target air pollution. First passed in 1963, with subsequent revisions in 1970, 1977, and 1990.

Lead (Pb): A heavy gray metal found in gasoline, paints, and plumbing. Exposure can adversely affect the nervous system.

National Ambient Air Quality Standards (NAAQS): Primary and secondary standards set at a national level for criteria pollutants. The purpose of these standards is to protect human health.

Nephelometer: A device that measures light scattering by fine particulate pollution in the air.

Nitrogen dioxide (NO_2): A brownish gas and strong oxidizing agent that is one of the major components of acid rain and smog.

Non-attainment area: An area designated by EPA in which National Ambient Air Quality Standards are exceeded.

Offset: A policy requiring reductions in emissions before a permit will be granted.

Ozone (O_3): A poisonous, bluish gas form of oxygen, which is the result of chemical reactions between volatile organic compounds and nitrogen oxides. Destroys crops and impairs breathing.

Particulate matter (PM_{10}, $PM_{2.5}$): Airborne particles resulting from wood stove burning, outdoor burning, road dust and industry, which can penetrate into the lungs and impair the respiratory system.

Point sources: Identifiable pollution sources such as large industries that emit significant levels of air pollutants in a particular geographic location.

PSD: Prevention of Significant Deterioration. A permit issued before construction can begin on new or expanded facilities that emit air pollutants. The purpose of the permit is to ensure that the air pollution in the area does not reach unhealthy levels in areas currently meeting federal standards, and that the facility is using BACT.

SPMS: Special Purpose Monitoring Site. Used by SWCAA mainly for short-term studies of air pollution or non-criteria pollutant monitoring.

SLAMS: State and Local Air Monitoring Site. Site for air monitoring and data collection.

SIP: State Implementation Plan. A plan the state adopts to ensure that state air quality objectives are met.

Sulfur dioxide (SO_2): A gas or liquid resulting from the burning of sulfur-containing fuel. May cause breathing problems.

Telemetry: A method of collecting data from monitoring sites. Data is electronically sent over telephone lines to a central computer at SWCAA.

Toxic air pollutants: Compounds that may cause cancer and/or other health problems at extremely low concentrations.

Volatile organic compounds (VOCs): Unstable carbon-based compounds that combine with nitrogen oxides, sunlight, and high ambient temperatures to produce ozone.

Appendix E

Facts You Should Know About Your Clean Air Agency and How You Can Help

Southwest Clean Air Agency
Serving Clark, Cowlitz, Lewis, Skamania and Wahkiakum Counties

Who is SWCAA?

The Southwest Clean Air Agency (SWCAA) was formed after passage of the 1967 Clean Air Act of Washington (RCW 70.94). That Act required the more populated counties within the State of Washington to activate local air pollution control authorities. Altogether, there are seven such agencies within the State. Many people think that SWCAA is part of the City, County, State or Federal government, but in actuality, we are a separate government entity classified as a municipal corporation. Our jurisdiction includes the five counties of Clark, Cowlitz, Lewis, Skamania and Wahkiakum. It covers a total of 6,127 square miles and serves an estimated population of 559,167 in 2003.

Mission

The mission of SWCAA is to preserve, and enhance air quality in southwest Washington.

Purpose

SWCAA administers the laws and regulations regarding air pollution control. The basis for these laws and regulations can be state, federal, our own air pollution control regulations, the State Environmental Policy Act, or State Implementation Plan requirements. There are also agreements with other governmental agencies, such as the State Department of Ecology and the State Department of Natural Resources regarding funding, program commitments, and outdoor burning control.

History

In December of 1968, the Agency's Board of Directors adopted Regulation 1, which together with the Washington Clean Air Act, became the primary air pollution control law for SWCAA. In October 1969, the Board of Directors adopted Regulation 2 to establish additional controls for industrial pollution sources. Regulations 1 and 2 have been amended numerous times to meet state and federal requirements and to establish programs necessary for control of air pollution.

Responsibilities

In achieving the purposes of the Clean Air Act, SWCAA is to hold hearings, control emissions of air contaminants through the adoption of regulations, review new sources, maintain proper records of operations, contract with individuals for studies and reports, and inspect and monitor air pollution sources and levels. SWCAA issues citations, initiates court suits, or uses other legal means to enforce the provisions of this regulation.

Funding

The State Clean Air Act empowers local air pollution control boards to apply to the state and federal governments for grants-in-aid, to charge fees for certain services, and to assess cities and counties within SWCAA's boundaries for "supplemental income" in proportion to their population. SWCAA has financed its program through state and federal grants, permit fees from industry, assessments

of cities and counties within its five county jurisdiction according to population, and through penalties collected for infractions.

Board of Directors

The governing Board of SWCAA consists of eleven members. This includes a County Commissioner from each of the five counties, one City Council representative from the largest city within each of the five counties, and one member-at-large.

The Board of Directors holds public meetings on the first Thursday of each month at 3:00 p.m. Meetings are held at SWCAA's office, located at 11815 NE 99th Street, Suite 1294, Vancouver, WA.

Staff and Responsibilities

SWCAA employs a professional staff to provide technical, engineering, enforcement, and administrative and clerical support.

The Executive Director is appointed by the Board of Directors to serve in a professional capacity as its technical advisor and administrative officer.

The engineering staff reviews new source applications, provides information on regulations to interested parties, maintains the emission inventory, assists in source testing activities, and gives technical assistance to inspectors. They review environmental impact statements, SEPA actions, coordinate with city and county departments, and assist in regulation review. They also assist in developing control plans to meet and maintain air quality standards and conduct or review special studies.

Scientists conduct source inspections, respond to citizen complaints, do routine surveillance to maintain compliance of point sources and enforce air pollution regulations. They maintain the air-monitoring network and perform data analysis and quality assurance. They provide computer service assistance to other agency staff and assist in the planning and development of plans to meet and maintain air quality standards. All staff members participate in special projects, routine information requests, enforcement and public education programs.

Public education staff maintains agency publications and website. Public outreach activities include public and school presentations and other community events.

The administrative staff provides a variety of specialized secretarial/clerical assistance, performs work in accounting, financial records, preparation of periodic reports, fiscal status reports, payroll, personnel records, library filing, and other assistance as needed by the Agency staff.

Advisory Council

An Advisory Council consisting of at least five members advises the Executive Director and Board of Directors on air pollution matters. At least one of the five members is to represent industry and one member shall represent the environmental community. All representatives should be skilled and experienced in the field of air pollution control. They are appointed by the Executive Director.

Air Sampling

An air pollution monitoring network is operated within SWCAA's jurisdiction. Pollutants currently sampled are small size particulate (PM_{10}, $PM_{2.5}$), carbon monoxide, and ozone. Meteorological parameters are also monitored, including temperature, wind speed, wind direction, visibility and related statistical indicators. Special studies also occur for monitoring other compounds as needed.

Violations

As a means of enforcing the regulations, SWCAA has the responsibility to issue civil penalties and initiate actions in court. Additional means of enforcement include injunctions, restraining orders, assurances of discontinuance, and other administrative means.

Public Education and Information

SWCAA maintains a library of information on environmental issues, which is open to the public for research purposes. Informational brochures, leaflets, and fact sheets are available upon request. Staff members are available for presentations to civic, educational and other interested groups. Telephone message lines provide information on air pollution levels and seasonal topics like woodstoves and outdoor burning. Information on specific air pollution problems, current control requirements and general regulations is also available.

How to Get More Information

SWCAA Office: (360) 574-3058 or 1-800-633-0709
Burning and Wood Stove Information: (360) 574-0057
Website: www.swcleanair.org
(e-mail addresses for all SWCAA staff can be found on the web page under Staff)

If everyone does something,

we can keep the air clear in southwest Washington!

1. Avoid using your wood stove or fireplace when air quality is poor.

2. Burn only dry, seasoned wood in your wood stove or fireplace.

3. Observe outdoor burning restrictions and use alternative disposal means.

3. Keep your car tuned for fuel efficiency.

4. Combine your errands into just one trip.

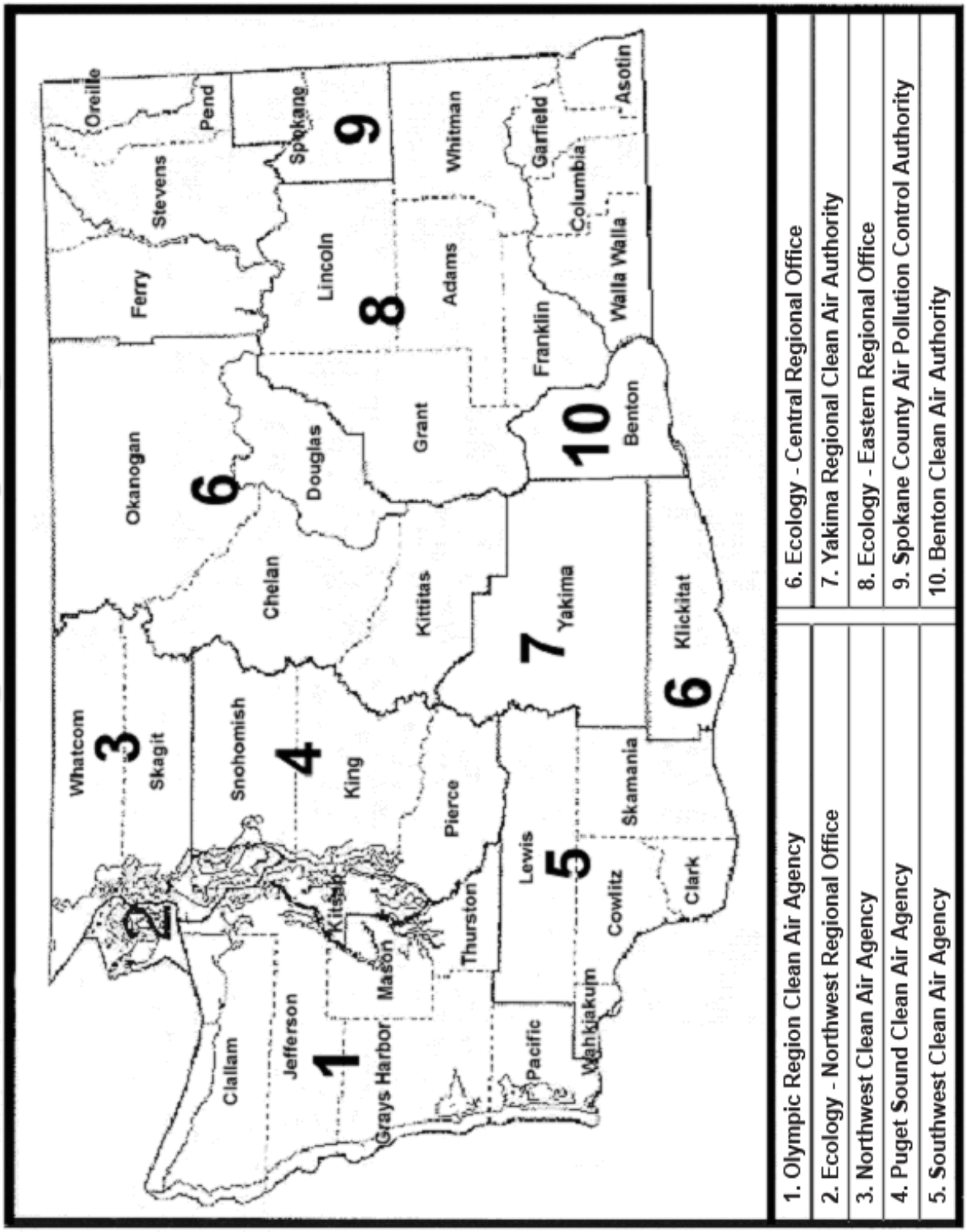
5. Walk or ride your bike on short trips.

6. Take the bus or car pool at least one day a week.

7. Use the phone to cut down on “looking and travel” time.

Appendix F

State Air Regulatory Agencies



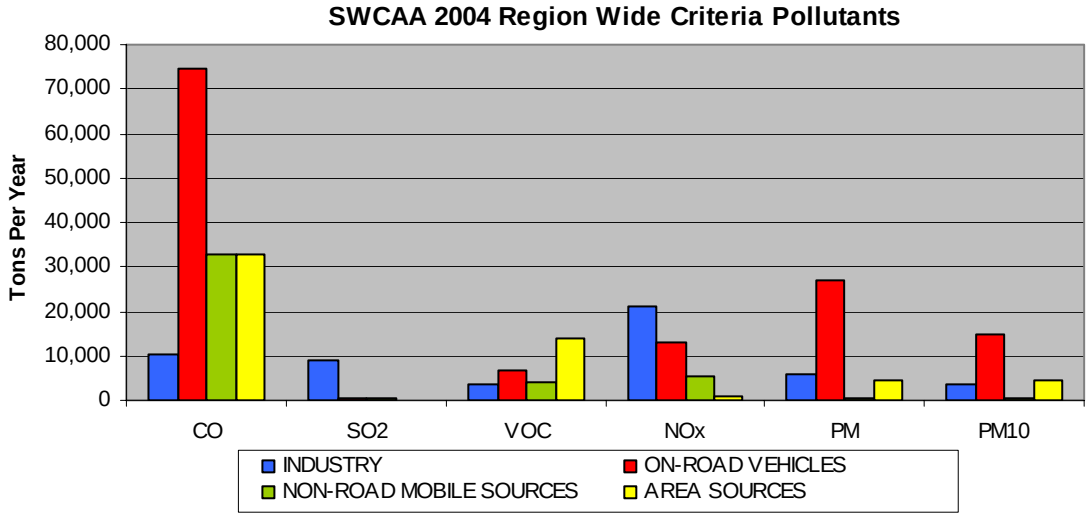
Appendix G

Emissions Inventory

The Federal Clean Air Act Amendments of 1990, passed by Congress, recognized that many areas across the United States were in violation of the National Ambient Air Quality Standards (NAAQS) for ozone and/or carbon monoxide (CO). To develop and implement an effective air quality control strategy, an air pollution control agency must compile information on the important sources of these pollutants. The role of the emission inventory is to identify the source types present in an area, the amounts of each pollutant emitted and the types of processes and control devices employed at each plant.

Emission Sources

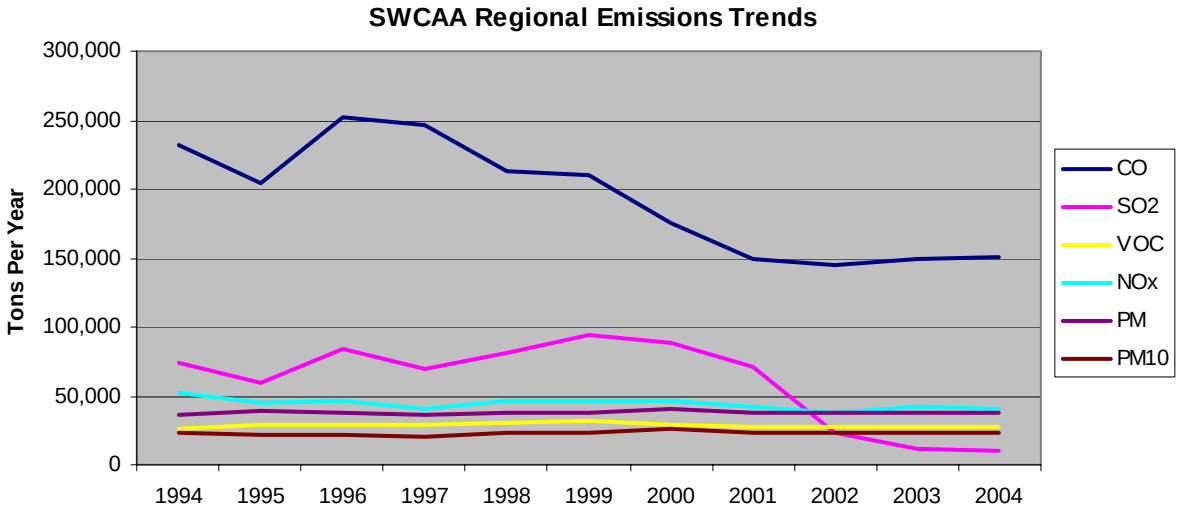
Air pollutants are emitted from a wide variety of sources in southwest Washington. Sources are often lumped into three broad categories: point sources, area sources and mobile sources. Point sources are traditionally stationary facilities like factories. Mobile sources represent motor vehicles of all types. Area sources are widely dispersed and often non-regulated and non-controlled. Dry cleaning, painting operations, outdoor burning, gasoline lawn mowers, and biogenic sources such as forest and brush fires are some examples of area sources.



Point sources emit relatively large volumes of pollutants from a single location. Examples include rock quarries, lumber mills, and other manufacturing plants and processes. Each source over 100 tons per year (major source) operates under a Title V Air Operating Permit. Each source less than 100 tons per year operates under one or more Air Discharge Permits issued by SWCAA or, if grandfathered, the source must comply with the General Regulations for Air Pollution Sources (SWCAA 400). Each source must demonstrate that it can operate with its emissions at or below the emission limits prescribed by SWCAA as stated in their Air Discharge Permit and/or SWCAA 400.

Area sources are classified as categories of relatively small individual sources of pollution usually spread over a broad geographic area that collectively contribute significant levels of emissions. Gas stations, dry cleaners, wood stoves, slash and field burns, forest fires, backyard burning, and dust emissions from roads are examples of area sources. With the exception of gas stations and dry cleaners, area sources usually do not operate under the emission permit system.

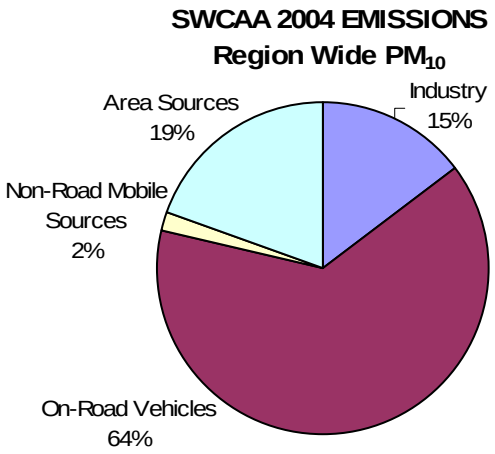
Mobile sources include cars, trucks, and other vehicles. There are both “on-road vehicle” and “off-road vehicle” components to this category. While each individual unit in the area or mobile source categories may emit only a small amount of pollution, taken as a whole their emissions are generally much larger than those from point sources in southwest Washington. In fact, transportation accounts for over 50 percent of all air pollution nationwide.



SWCAA maintains a detailed inventory of air pollution emissions in southwest Washington. Our inventory is normally compiled and reported to EPA once per year.

Particulate Emissions

In recent years, the Portland/Vancouver Air Quality Maintenance Area (AQMA) has seen considerable variation in particulate emissions from industrial sources as a result of fluctuating production levels. The overall trend suggests that emissions from point sources are decreasing. This is probably a result of improved pollution control equipment. However, the benefits of these reductions appear to have been offset to a certain degree by increased emissions from area sources such as home heating with wood.

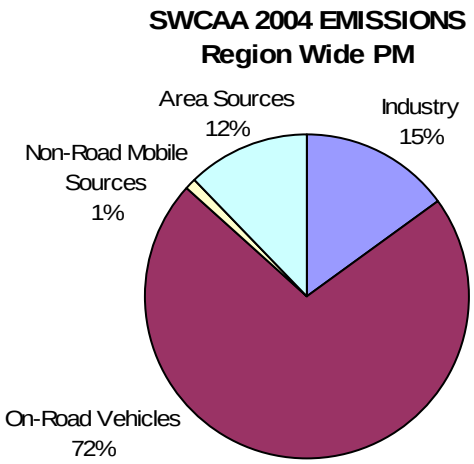


The EPA Wood Stove Testing and Certification Program is expected to continue reducing particulate emissions in the future by ensuring that both new and replacement wood stoves are of the cleaner burning variety.

It is in the interest of SWCAA and its citizens to be able to monitor the ambient air on a continuous basis and in a manner that provides for the generation of accurate and timely data. Until 1994, monitoring for particulate matter was only conducted with high volume PM_{10} samplers. While these units provide very accurate data, they do not provide it instantaneously. Currently the standards are based on 24-hour average and annual rolling average data in micrograms per cubic meter. The high volume samplers provided this data in a manner that allowed SWCAA and other control agencies to monitor the quality of the air based on these standards. The drawback to this method is that there is often a several day lag period between when the sample is collected and when it can be processed, weighed and evaluated. In some cases by the time this analysis has been

completed, the problem condition has either passed or worsened. For this reason, it became obvious that an alternate or supplemental method of monitoring was appropriate.

SWCAA placed into operation its first tapered element oscillating microbalance mass monitoring unit or "TEOM" in 1994. This equipment provides accurate real time measuring of the fine particulate levels. When the sampler is linked with the statewide telemetry system, staff is able to continuously monitor the ambient concentrations. By being able to monitor particulate matter in the air continuously and generate data in the form of 15- or 60-minute averages it provides SWCAA with the ability to take action before violations or health effects occur. Used in a program of wood stove and outdoor burning curtailment alerts, the TEOM unit is a very useful tool in SWCAA's overall program of air pollution control.

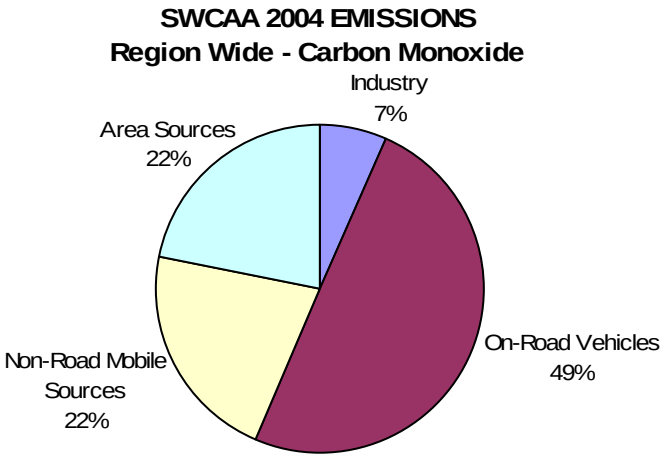


The TEOM was installed and operating at the Moose Lodge in Vancouver in 1994 and equipped for telemetry by mid 1995. SWCAA has since been able to monitor the data on the agency's computers. This permits the Agency to closely monitor changing situations and is very helpful in providing data for curtailment calls in outdoor burning and wood stove/fireplace use. The public can now access this and other monitoring data on the Internet at https://fortress.wa.gov/ecy/aqp/Public/databyarea.shtml.

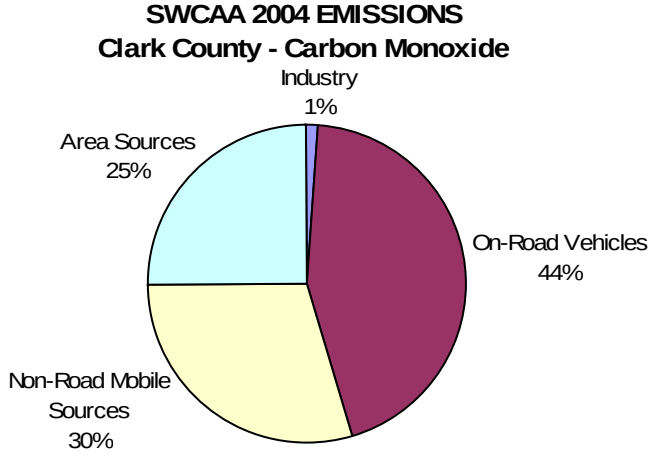
Another change occurred on July 18, 1997 with EPA's adoption of a new $PM_{2.5}$ National Ambient Air Quality Standard (NAAQS). Because three full years of valid data are required before a compliance determination could be made with the new $PM_{2.5}$ standard, SWCAA installed a new $PM_{2.5}$ particulate monitor at the Moose Lodge monitoring site in November of 1998 to collect data for eventual compliance determination. However, in May of 1999, the DC Circuit Court of Appeals remanded the new $PM_{2.5}$ standard (along with the new 8-hour ozone standard) in response to a special interest appeal challenging EPA's authority to implement the new standards. Following a failed petition to the Court of Appeals for rehearing, the EPA successfully petitioned the U.S. Supreme Court to review the underlying issues. On March 26, 2002, the DC Circuit Supreme Court upheld the EPA's $PM_{2.5}$ and 8-hour ozone standards. On the expectation that EPA would prevail, the $PM_{2.5}$ particulate monitor at the Moose Lodge monitoring site continued to operate without interruption. Also, in order to complement this new monitoring program, the Moose Lodge TEOM was converted to measure $PM_{2.5}$ rather than PM_{10}, and a temporary $PM_{2.5}$ particulate monitor was installed atop the Centralia Library. These complementary changes were made in December of 1999. All five counties within SWCAA jurisdiction were determined by EPA to be in attainment with the $PM_{2.5}$ standard on December 17, 2004. The Southwest Clean Air Agency continues to monitor $PM_{2.5}$ at Moose Lodge in Vancouver. Temporary $PM_{2.5}$ monitors have since been relocated to other communities and will continue to be rotated as monitoring objectives dictate.

Another impact of interest from fine particulate pollution in the atmosphere is visibility impairment caused by the light scattering effect of the fine particles. In June of 1999, an integrating nephelometer was installed on the roof of Vancouver's McLoughlin Middle School. This instrument provides a quantitative measure of this light scattering effect, complementing the photographic record from the visibility camera atop the Smith Tower in downtown Vancouver. The camera was installed in November of 1998 and is focused on Mount Hood. McLoughlin Middle School is in the Vancouver urban area, within the camera's view path. In 2003 the camera was replaced with a digital camera to provide better images more frequently and reliably.

Carbon Monoxide Emissions



Trends indicate a gradual reduction in ambient levels of carbon monoxide (CO) in the Vancouver area. Because CO accumulation is so dependent on weather conditions and patterns, trends of this nature should be viewed with cautious optimism. During 1987 the Vancouver sampling site experienced four exceedances of the eight-hour average standard of 9 parts per million. In 1992 and 1993, there were no exceedances recorded, but one exceedance was recorded in January 1994. None were recorded since, until January 10, 1999 when an exceedance was recorded at the Atlas & Cox site in Vancouver. Because this was the only exceedance in 1999 it did not result in a violation of the federal standard. The graph on page 25 depicts this trend in more detail. There have not been any exceedances since 1999.



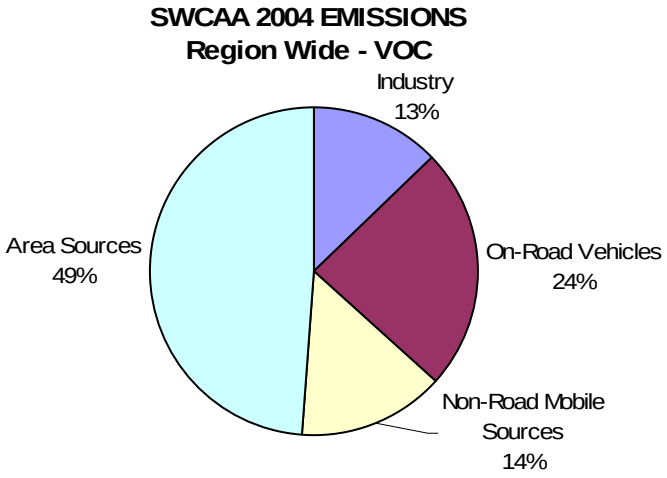
The federal Clean Air Act Amendments of 1990 passed by Congress required that carbon monoxide attainment be reached by December 31, 1995 in order for southern Clark County to avoid sanctions from the U.S. Environmental Protection Agency. Southern Clark County had not violated the carbon monoxide health standards for three consecutive years and only exceeded the standards once in 1994, making it eligible to request redesignation. A technical advisory committee, made up of interested individuals from the community, was formed for this endeavor in early 1994 and worked throughout that year and 1995 on a 10-year Maintenance Plan for the region. The redesignation request provided for the removal of the oxygenated fuel program upon EPA approval of the plan. This was done because projections indicated that the carbon monoxide emission reductions from the vehicle fleet and maintenance programs would keep the area in attainment. This proposal was adopted by SWCAA's Board of Directors on December 19, 1995, and a state implementation plan (SIP) hearing was held on January 30, 1996. Redesignation was approved by the EPA in October of 1996 and the use of oxygenated fuel was discontinued in November of 1996. SWCAA continues to operate according to the terms of the Carbon Monoxide Maintenance Plan.

Ozone

The ozone trend in the Vancouver area had been fairly constant until the mid 1990s. Historically, exceedances had not been recorded on the Washington side of the Columbia River. Over the years, nearly all exceedances have occurred in the Portland, Oregon area of the non-attainment area. SWCAA, however, experienced its first exceedance since 1982 on July 20, 1994. Three exceedances were recorded in the Portland area during the 1998 ozone season and none since. The federal Clean Air Act Amendments of 1990 passed by Congress require that ozone attainment be reached by December 31, 1993 in order for southern Clark County to avoid sanctions from the U.S. EPA. The Portland/Vancouver area met that deadline and applied for redesignation to

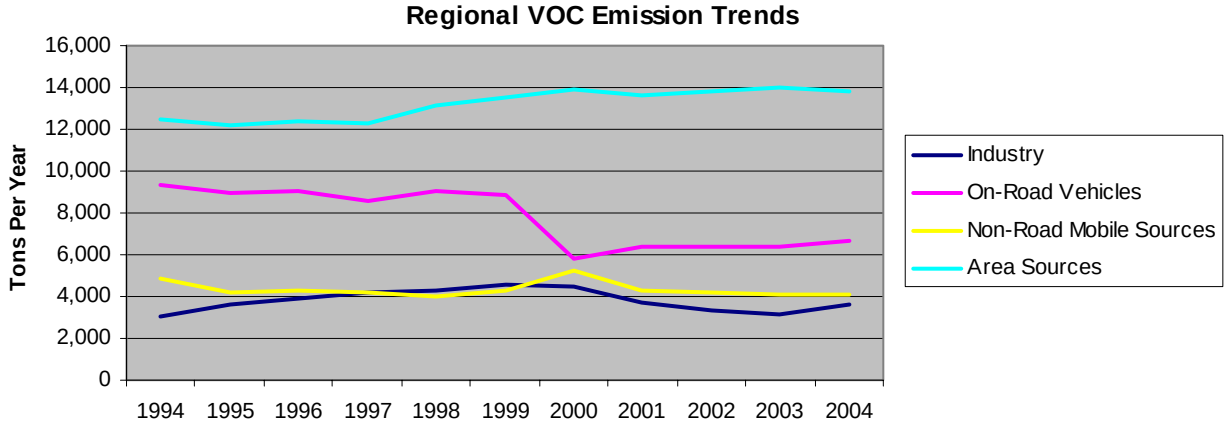
attainment status. SWCAA, in conjunction with the Oregon Department of Environmental Quality (ODEQ) requested redesignation to attainment status for ozone in midyear 1996. SWCAA's technical advisory committee developed a 10-year Ozone Maintenance Plan, simultaneously with the Carbon Monoxide Maintenance Plan. Additional control measures were implemented in Clark County so population growth would not cause a return to dirty air or non-attainment status. These measures, including an expanded vehicle inspection boundary and better vehicle emission test methods, were part of the redesignation request. Additional ambient sampling was also planned in the region for volatile organic compounds (VOC), ozone (O_3) and nitrogen oxides (NO_x). This expanded testing began in 1996 with the objective of gathering data needed to analyze the ozone formation process in southwest Washington and to determine the significance of any impacts caused in the metropolitan area by upwind sources. In addition, more meteorological monitoring sites were planned as well. A Vancouver site was established in 1996, additional sites to the north were established in 1997, and expanded testing continued through the ozone season of 1998. The Portland/Vancouver area was redesignated attainment by the EPA in April of 1997 and SWCAA continues to operate according to the terms of the Ozone Maintenance Plan. In 2006 SWCAA will work with ODEQ to develop a second 10-year Ozone Maintenance plan and Carbon Monoxide Maintenance Plan.

Volatile Organic Compound Emissions

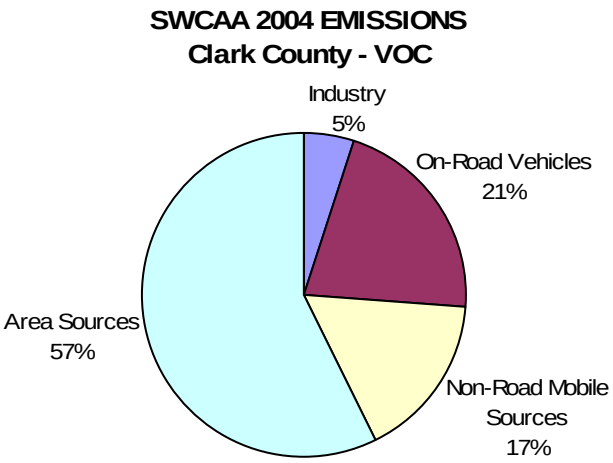


The relationship between volatile organic compound emissions and ambient ozone levels is not a simple one. This is largely because of the complex nature of ozone formation and its dependence on sunlight, temperature and atmospheric mixing. Generally the ozone-forming potential of an airshed increases with increasing VOC and NO_x emissions.

Emission inventories show steady and substantial decreases in VOC emissions within the Portland/Vancouver ozone non-attainment (now maintenance) area in recent years, but this trend is expected to reverse itself due to population growth. Major reductions in VOC emissions have been achieved through the federal new automobile program, and industrial emissions control. Future major reductions will come from Vancouver's vehicle inspection and maintenance program and local transportation control strategies, even though traffic volumes continue to increase significantly. Industrial and commercial emissions from gasoline handling have also been substantially reduced by improved controls on gasoline storage, transportation, and delivery systems. Further reductions have been realized by additional controls and process changes in surface coating, degreasing technology, and other industrial processes.

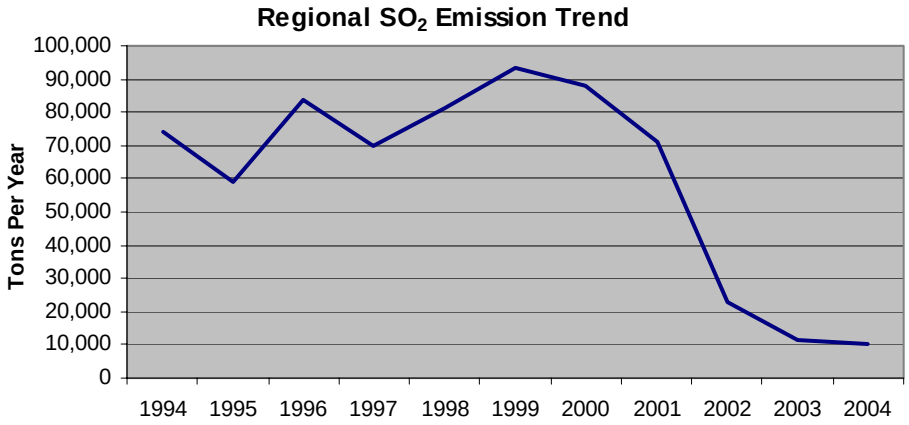


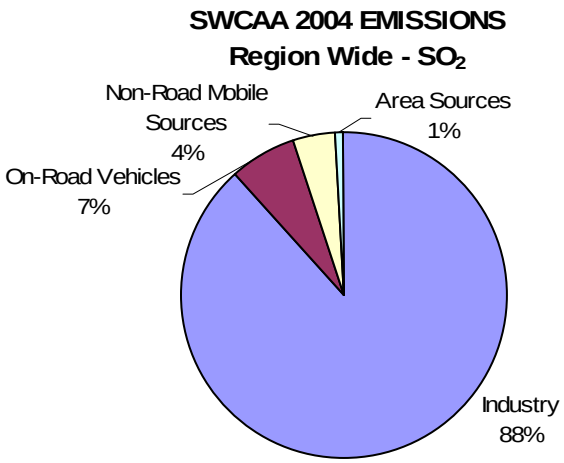
Vapor recovery at gasoline stations is another method of significantly reducing VOC emissions. This technology captures vapors from gasoline dispensing equipment instead of releasing them into the air. Implementation of this program began in 1991 when all gasoline stations were required to install equipment to recover vapors when transferring gasoline to underground storage tanks (Stage I). The second stage of the program involves installing special nozzles and hoses so that vapors are captured and recovered when gasoline is dispensed into vehicles (Stage II). This equipment has the added advantage of reducing public and attendant exposure to the harmful volatile components in gasoline. When fully implemented, this program is expected to reduce total VOC in the Portland/Vancouver airshed by roughly 3,000 tons per year. Continued traffic growth is expected to be the greatest challenge to maintaining compliance with the ozone standard in future years.

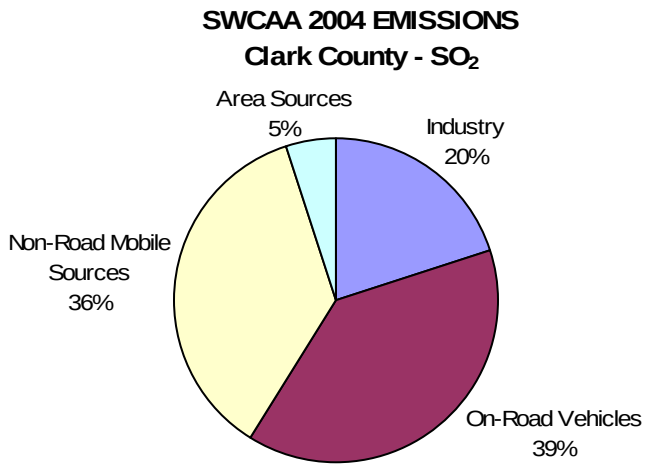


Sulfur Dioxide Emissions

Nationally, coal combustion is the major source of SO_2 emissions. The only coal-fired power plant in Washington is in SWCAA's jurisdiction. In 2002, the second of two sulfur dioxide scrubbers became operational at the power plant, completing a major project to reduce SO_2 emissions from this source by about 90 percent. However, even with this reduction, this source remains the dominant industrial SO_2 polluter in SWCAA's jurisdiction.







TOTAL SWCAA REGIONAL EMISSIONS

2004 Annual Emissions Inventory

	Tons per Year					
	CO	SO_2	VOC	NO_x	PM	PM_{10}
INDUSTRY	10,139	8,985	3,603	21,108	5,706	3,445
ON-ROAD VEHICLES	74,624	670	6,705	12,941	27,150	14,909
NON-ROAD MOBILE SOURCES	32,589	447	4,053	5,461	466	466
AREA SOURCES	32,747	71	13,803	882	4,623	4,530
TOTAL	150,099	10,173	28,164	40,392	37,945	23,350
INDUSTRY						
Large Industries	9,872	8,943	3,003	20,555	4,719	2,818
Small industries	267	42	600	553	987	627
sub-total	10,139	8,985	3,603	21,108	5,706	3,445
ON-ROAD VEHICLES						
Vehicles	74,624	670	6,705	12,941	1,117	1,117
Road Dust Paved	0	0	0	0	24,518	13,186
Road Dust Unpaved	0	0	0	0	1,514	606
sub-total	74,624	670	6,705	12,941	27,149	14,909
NON-ROAD MOBILE SOURCES						
Aircraft	1,187	1	38	6	0	0
Vessels/ships	146	40	78	461	14	14
Railroads	220	128	90	2,206	54	54
Lawn & Garden Equipment	16,221	9	1,508	40	34	34
Recreational Vehicles	821	0	255	1	4	4
Recreational Marine Vehicles	4,181	11	1,338	137	57	57
Light Commercial Equipment	5,816	7	241	54	7	7
Industrial Equipment	1,094	7	75	149	9	9
Construction Equipment	2,865	241	421	2,369	281	281
Agricultural Equipment	38	3	9	38	6	6
Logging Equipment	0	0	0	0	0	0
sub-total	32,589	447	4,053	5,461	466	466
AREA SOURCES						
Solvent Utilization	0	0	7,840	0	0	0
Gasoline Storage and Dispensing	0	0	731	0	0	0
Stationary Source Fuel Combustion	153	15	69	432	45	45
Woodstoves/Fireplaces	28,919	53	4,749	358	4,052	4,052
Residential Trash & Yard Burning	817	3	198	41	139	139
Slash Burning	2,640	0	182	43	322	229
Structure and Wildfires	218	0	34	6	65	65
sub-total	32,747	71	13,803	882	4,623	4,530

Clark County Emissions

2004 Annual Emissions Inventory

	Tons per Year					
	CO	**SO_2**	**VOC**	**NO_x**	**PM**	**PM_{10}**
INDUSTRY	949	183	749	987	511	433
ON-ROAD VEHICLES	33,555	356	3,249	6,371	14,425	7,922
NON-ROAD MOBILE SOURCES	22,491	331	2,536	3,889	348	348
AREA SOURCES	19,164	46	8,781	551	2,769	2,751
TOTAL	76,159	916	15,315	11,798	18,055	11,456
INDUSTRY						
Large Industries	815	155	412	788	228	224
Small industries	134	28	337	199	283	209
sub-total	949	183	749	987	511	433
ON-ROAD VEHICLES						
Vehicles	33,555	356	3,249	6,371	594	594
Road Dust Paved	0	0	0	0	13,027	7,006
Road Dust Unpaved	0	0	0	0	804	322
sub-total	33,555	356	3,249	6,371	14,425	7,922
NON-ROAD MOBILE SOURCES						
Aircraft	808	1	26	4	0	0
Vessels/ships	99	27	53	314	10	10
Railroads	150	87	61	1,501	37	37
Lawn & Garden Equipment	11,040	6	827	30	23	23
Recreational Vehicles	558	0	163	1	3	3
Recreational Marine Vehicles	2,846	8	893	94	39	39
Light Commercial Equipment	3,959	5	132	39	5	5
Industrial Equipment	745	5	50	97	6	6
Construction Equipment	2,281	192	330	1,805	224	224
Agricultural Equipment	5	0	1	4	1	1
Logging Equipment	0	0	0	0	0	0
sub-total	22,491	331	2,536	3,889	348	348
AREA SOURCES						
Solvent Utilization	0	0	5,257	0	0	0
Gasoline Storage and Dispensing	0	0	343	0	0	0
Stationary Source Fuel Combustion	104	10	47	294	30	30
Woodstoves/Fireplaces	18,301	34	2,989	227	2,569	2,569
Residential Trash & Yard Burning	223	2	96	20	61	61
Slash Burning	393	0	27	6	66	48
Structure and Wildfires	143	0	22	4	43	43
sub-total	19,164	46	8,781	551	2,769	2,751

Cowlitz County Emissions

2004 Annual Emissions Inventory

	Tons per Year					
	CO	SO_2	VOC	NO_x	PM	PM_{10}
INDUSTRY	3,918	1,858	2,352	3,754	1,256	889
ON-ROAD VEHICLES	20,719	159	1,744	3,314	6,419	3,525
NON-ROAD MOBILE SOURCES	5,283	57	792	767	57	57
AREA SOURCES	7,419	15	2,748	175	944	929
TOTAL	37,338	2,089	7,636	8,010	8,676	5,400
INDUSTRY						
Large Industries	3,871	1,853	2,214	3,628	860	679
Small industries	47	5	138	126	396	210
sub-total	3,918	1,858	2,352	3,754	1,256	889
ON-ROAD VEHICLES						
Vehicles	20,719	159	1,744	3,314	264	264
Road Dust Paved	0	0	0	0	5,797	3,118
Road Dust Unpaved	0	0	0	0	358	143
sub-total	20,719	159	1,744	3,314	6,419	3,525
NON-ROAD MOBILE SOURCES						
Aircraft	201	0	6	1	0	0
Vessels/ships	25	7	13	78	2	2
Railroads	37	22	15	373	9	9
Lawn & Garden Equipment	2,745	2	361	5	6	6
Recreational Vehicles	139	0	49	0	1	1
Recreational Marine Vehicles	707	2	236	23	10	10
Light Commercial Equipment	984	1	58	8	1	1
Industrial Equipment	185	1	13	28	2	2
Construction Equipment	252	21	39	243	25	25
Agricultural Equipment	8	1	2	8	1	1
Logging Equipment	0	0	0	0	0	0
sub-total	5,283	57	792	767	57	57
AREA SOURCES						
Solvent Utilization	0	0	1,433	0	0	0
Gasoline Storage and Dispensing	0	0	168	0	0	0
Stationary Source Fuel Combustion	26	3	12	73	8	8
Woodstoves/Fireplaces	6,005	11	1,007	74	835	835
Residential Trash & Yard Burning	292	1	49	10	38	38
Slash Burning	1,058	0	73	17	52	37
Structure and Wildfires	38	0	6	1	11	11
sub-total	7,419	15	2,748	175	944	929

Lewis County Emissions

2004 Annual Emissions Inventory	Tons per Year					
	CO	SO_2	VOC	NO_x	PM	PM_{10}
INDUSTRY	5,250	6,943	488	16,335	3,902	2,093
ON-ROAD VEHICLES	17,833	136	1,501	2,853	5,525	3,034
NON-ROAD MOBILE SOURCES	4,000	48	603	650	53	53
AREA SOURCES	4,948	9	1,881	125	728	685
TOTAL	32,031	7,136	4,473	19,963	10,208	5,865
INDUSTRY						
Large Industries	5,186	6,935	377	16,139	3,632	1,915
Small industries	64	8	111	196	270	178
sub-total	5,250	6,943	488	16,335	3,902	2,093
ON-ROAD VEHICLES						
Vehicles	17,833	136	1,501	2,853	227	227
Road Dust Paved	0	0	0	0	4,990	2,684
Road Dust Unpaved	0	0	0	0	308	123
sub-total	17,833	136	1,501	2,853	5,525	3,034
NON-ROAD MOBILE SOURCES						
Aircraft	149	0	5	1	0	0
Vessels/ships	18	5	10	58	2	2
Railroads	28	16	11	277	7	7
Lawn & Garden Equipment	2,036	1	268	4	4	4
Recreational Vehicles	103	0	36	0	0	0
Recreational Marine Vehicles	525	1	175	17	7	7
Light Commercial Equipment	730	1	43	6	1	1
Industrial Equipment	137	1	10	20	1	1
Construction Equipment	249	21	39	241	24	24
Agricultural Equipment	25	2	6	26	4	4
Logging Equipment	0	0	0	0	0	0
sub-total	4,000	48	603	650	53	53
AREA SOURCES						
Solvent Utilization	0	0	941	0	0	0
Gasoline Storage and Dispensing	0	0	205	0	0	0
Stationary Source Fuel Combustion	19	2	9	54	6	6
Woodstoves/Fireplaces	3,788	7	619	47	532	532
Residential Trash & Yard Burning	248	0	43	9	33	33
Slash Burning	863	0	59	14	148	105
Structure and Wildfires	30	0	5	1	9	9
sub-total	4,948	9	1,881	125	728	685

Skamania County Emissions

2004 Annual Emissions Inventory

	Tons per Year					
	CO	SO_2	VOC	NO_x	PM	PM_{10}
INDUSTRY	21	1	11	31	36	27
ON-ROAD VEHICLES	1,717	13	144	275	532	292
NON-ROAD MOBILE SOURCES	593	8	88	113	9	9
AREA SOURCES	738	1	273	18	107	102
TOTAL	3,068	23	516	437	684	430
INDUSTRY						
Large Industries	0	0	0	0	0	0
Small industries	21	1	11	31	36	27
sub-total	21	1	11	31	36	27
ON-ROAD VEHICLES						
Vehicles	1,717	13	144	275	22	22
Road Dust Paved	0	0	0	0	480	258
Road Dust Unpaved	0	0	0	0	30	12
sub-total	1,717	13	144	275	532	292
NON-ROAD MOBILE SOURCES						
Aircraft	21	0	1	0	0	0
Vessels/ships	3	1	1	8	0	0
Railroads	4	2	2	40	1	1
Lawn & Garden Equipment	291	0	38	1	1	1
Recreational Vehicles	15	0	5	0	0	0
Recreational Marine Vehicles	75	0	25	2	1	1
Light Commercial Equipment	104	0	6	1	0	0
Industrial Equipment	20	0	1	3	0	0
Construction Equipment	60	5	9	58	6	6
Agricultural Equipment	0	0	0	0	0	0
Logging Equipment	0	0	0	0	0	0
sub-total	593	8	88	113	9	9
AREA SOURCES						
Solvent Utilization	0	0	152	0	0	0
Gasoline Storage and Dispensing	0	0	8	0	0	0
Stationary Source Fuel Combustion	3	0	1	8	1	1
Woodstoves/Fireplaces	596	1	97	7	84	84
Residential Trash & Yard Burning	39	0	7	1	5	5
Slash Burning	95	0	7	2	16	11
Structure and Wildfires	5	0	1	0	1	1
sub-total	738	1	273	18	107	102

Wahkiakum County Emissions

2004 Annual Emissions Inventory

	Tons per Year					
	CO	SO_2	VOC	NO_x	PM	PM_{10}
INDUSTRY	1	0	3	1	3	3
ON-ROAD VEHICLES	800	6	67	128	248	136
NON-ROAD MOBILE SOURCES	222	3	34	42	2	2
AREA SOURCES	478	0	120	11	75	63
TOTAL	1,501	9	224	182	328	204
INDUSTRY						
Large Industries	0	0	0	0	0	0
Small industries	1	0	3	1	3	3
sub-total	1	0	3	1	3	3
ON-ROAD VEHICLES						
Vehicles	800	6	67	128	10	10
Road Dust Paved	0	0	0	0	224	120
Road Dust Unpaved	0	0	0	0	14	6
sub-total	800	6	67	128	248	136
NON-ROAD MOBILE SOURCES						
Aircraft	8	0	0	0	0	0
Vessels/ships	1	0	1	3	0	0
Railroads	1	1	1	15	0	0
Lawn & Garden Equipment	109	0	14	0	0	0
Recreational Vehicles	6	0	2	0	0	0
Recreational Marine Vehicles	28	0	9	1	0	0
Light Commercial Equipment	39	0	2	0	0	0
Industrial Equipment	7	0	1	1	0	0
Construction Equipment	23	2	4	22	2	2
Agricultural Equipment	0	0	0	0	0	0
Logging Equipment	0	0	0	0	0	0
sub-total	222	3	34	42	2	2
AREA SOURCES						
Solvent Utilization	0	0	57	0	0	0
Gasoline Storage and Dispensing	0	0	7	0	0	0
Stationary Source Fuel Combustion	1	0	0	3	0	0
Woodstoves/Fireplaces	229	0	37	3	32	32
Residential Trash & Yard Burning	15	0	3	1	2	2
Slash Burning	231	0	16	4	40	28
Structure and Wildfires	2	0	0	0	1	1
sub-total	478	0	120	11	75	63