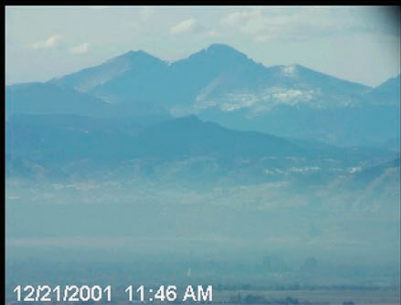
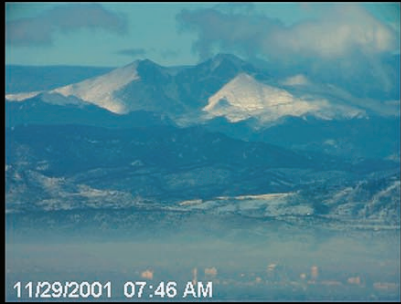
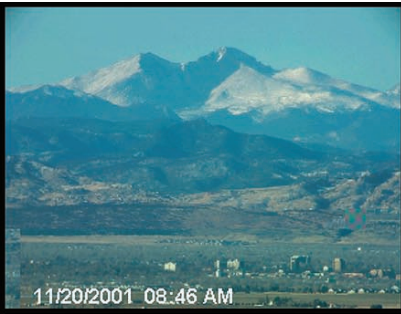


FORT COLLINS, COLORADO



SUMMER 2004



AIR QUALITY PLAN

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S.0 EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

Introduction

The 2004 Fort Collins Air Quality Plan sets forth policies and strategies that will guide the City's efforts to improve air quality over the next five years. It is an element of Fort Collins' Comprehensive Plan (City Plan) and the City Council adopted its principles and policies by resolution in June 2004.

In order to streamline air quality planning, this Plan combines and updates two earlier documents, the 1993 Air Quality Policy Plan and the 2000-2003 Air Quality Action Plan. In its new, combined format, the Air Quality Plan will be updated every five years in conjunction with updates to City Plan and the Transportation Master Plan.

There are two key reasons why a city government should have an air quality plan. First, city residents have high expectations for a clean environment. Residents have identified the Air Quality Program as being the single most important program for protecting their future quality of life, according to the City of Fort Collins 2003 Citizen Survey. Second, certain air quality problems and opportunities are most effectively handled at the local government level. The federal Clean Air Act (CAA) sets outdoor-air standards and emissions limits for equipment and fuels. Colorado state government has the responsibility for efforts to attain the federal outdoor-air standards, and County government provides enforcement of state air pollution permits. However, City programs can fill gaps that are left by federal, state, and county programs. Local experimentation may develop innovations that can be used in other communities as well as by state and federal agencies. Moreover, some air quality concerns can only be addressed at the local level. In Fort Collins, these concerns have included wood smoke, non-regulatory efforts to reduce tailpipe emissions, local Transportation Demand Management programs, radon, and secondhand tobacco smoke.

In sum, Fort Collins Air Quality Plan:

- Responds to a strong citizen mandate for the City to protect and improve air quality,
- Complements and fill gaps left by federal, state, and county efforts,
- Provides a long-term planning framework for air quality efforts,
- Recognizes and coordinates the efforts of several City departments, and
- Allows flexibility to respond to emerging issues.

Local Air Quality Conditions

Air quality has generally been improving in Fort Collins over the past decade, largely due to control programs mandated by the federal government and implemented by the state. Fort Collins no longer violates the federal carbon monoxide standard as it did throughout the 1980's and is now well in compliance with that standard. Fort Collins currently does not violate any of the National Ambient Air Quality Standards. However, ground-level ozone concentrations have remained flat over the past two decades and have begun to increase since 2000. Fort Collins

exceeded (but not did not technically violate) the new 8-hour ozone standard during the summer of 2003. This plan focuses increased attention on strategies to reduce ozone-forming pollutants.

Visibility, a measure of how the air looks, has seen minor improvements in recent years, but Fort Collins still violates the State's "guideline" visibility standard one out of every four days, on average. Residents of Fort Collins are all too familiar with the unsightly "Brown Cloud" that forms along the Front Range, including Fort Collins, at certain times of year.

Steps in the Planning Process

To prepare the 2004 Air Quality Plan, staff assessed the current air quality situation and status of air quality indicators in Fort Collins. According to a ranking process by City staff and Air Quality Advisory Board members, the air pollutants of greatest concerns in Fort Collins now are ozone, fine particles, mobile source hazardous air pollutants, and greenhouse gases. Medium priority pollutants include indoor air pollutants, nitrogen oxides, PM₁₀ (particulate mater of 10 microns or less), industrial hazardous air pollutants, and carbon monoxide. Motor vehicles remain the most important source of air pollution in Fort Collins, followed by emissions from commerce and industry, with pollution from residences coming in third.

Fundamentally, Fort Collins air quality planning continues to "stay the course". For the most part, only minor changes were made to existing policies during the 2004 update. City Council added new policies to address the increasing importance of emissions from non-road vehicles, the City's role in reducing ground-level ozone, and the City's role in public health issues related to air quality. A list of strategies was developed to implement air quality policies, and indicators were defined to measures progress in the future.

Throughout the development of the 2004 Air Quality Plan, staff invited comments from citizens, City Council advisory boards and consultants

Air Quality Policies

The 2004 City Plan Update contains ten air quality principles and policies (labeled ENV) that address land use, transportation, and greenhouse gases. With the Council adoption of the 2004 City Plan Update, the City retained its over-arching air quality goal, ***PRINCIPLE ENV-1: Continually improve Fort Collins' air quality as the city grows.*** In support of this goal, one City Plan principle specifically addresses Fort Collins' number-one source of air pollution by calling for reduced motor vehicle emissions through improved technology and reduced miles driven. Another City Plan air quality principle reiterates the City's goal to reduce greenhouse gas emission 30% below worst-case 2010 levels.

The Air Quality Plan supplements City Plan by identifying twenty-three additional air quality principles and policies (labeled AQ) that address commercial and residential sources, indoor air quality and health protection. Principle AQ-13 calls for reductions in commercial and industrial emissions, with a policy to assist efforts by businesses. Principle AQ-14 targets priority pollutants generated by residential sources such as wood smoke and ozone-forming pollutants. In Principle AQ-15, the desire to improve the air so it is healthy to breathe is expressed while

acknowledging limits to the City's role in health protection. Policies to support this principle call for partnerships with health professionals, a role for the City as "solution-seeker", and greater coordinated efforts to reduce health risks posed by air toxics and exposure to indoor air pollution. Finally, Principle AQ-16 challenges the City to lead by example and reduce air pollution generated by its own municipal operations.

Implementation Strategies

The City's comprehensive approach to improving air quality is exemplified by a wide variety of tactics presented in Chapter 4 of the Air Quality Plan. These range from the conventional to the "cutting edge" and from advisory-only to regulatory. The strategies are largely grouped according to the sources they affect, such as motor vehicles, commercial/industrial, residential, and City operations. The strategies are aimed primarily at reducing all emissions from a source category, rather than a specific pollutant. For example, reductions in wood burning lead to reductions in carbon monoxide, particulates, and air toxics, as well as improvements in the Brown Cloud.

In addition to the action strategies identified in this Plan, it is important to recognize that a number of other City programs provide important and innovative support for local air quality improvement. These include Fort Collins' Electric Energy Supply Policy, the SmartTrips program, the Advanced Traffic Management System, building energy codes, and City hydrogen programs.

Monitoring and Reporting

Air quality indicators, including pollution levels, vehicle miles of travel (VMT), and greenhouse gas inventories are identified in the Plan and will be used to assess progress achieving City air quality policies. City staff will prepare biennial status reports on air quality indicators. In addition, City staff will produce an annual report of air quality measurements from local monitoring stations including ozone, carbon monoxide, PM₁₀, PM_{2.5}, and visibility, along with a summary of activities undertaken to protect air quality. The Air Quality Plan will be updated every five years, in conjunction with updates to City Plan and the Transportation Master Plan. The indicator status reports will help to evaluate progress and determine potential policy and strategy changes for the next Air Quality Plan update.

1.0 INTRODUCTION

1.0 ABOUT THE AIR QUALITY PLAN

The Fort Collins Air Quality Plan (the Plan) sets forth principles and policies that guide the City's efforts to improve air quality for the next five years. It replaces the City's original Air Quality Plan which consisted of a 10-year Policy Plan, adopted in 1993, and a 4-year Action Plan, last adopted in 2000. In 2003, the City decided to merge the two documents by creating the one Air Quality Plan as a single, stand-alone document. This change elevates the level and frequency of air quality policy discussions, streamlines the planning process, and allows more flexibility to respond to emerging opportunities. City Council adopted the Chapter 3, the policy chapter, on June 4, 2004.

The Air Quality Plan is an element of City Plan, Fort Collins' Comprehensive Plan. As an element of City Plan, the Air Quality Plan must be considered when the City makes decisions.¹ The Plan can be used to guide the development of annual staff work plans and budget requests. Each year, the Natural Resources Department will evaluate and report on progress implementing the City's air quality policies. The Air Quality Plan will be updated every five years in conjunction with updates to City Plan and the Transportation Master Plan.

Chapter One identifies the City's role in air quality protection and summarizes the process used to develop this Plan. Chapter Two identifies local air pollutant priorities and air pollution source priorities.

Chapter Three contains all of the City's air quality principles and policies. Some of these air quality policies (dealing with land use, transportation, and greenhouse gases) are also contained in City Plan; some (dealing with commercial and residential air pollution sources, indoor air quality, and health) are just contained in this Plan. Chapter Three also restates the other Land Use and Transportation goals and policies contained in City Plan that support air quality improvement.

Chapter Four outlines broad implementation strategies that will be used by air quality staff in the Natural Resources Department to achieve air quality principles and policies. Major initiatives conducted by other City departments that benefit air quality are also mentioned here. Chapter Five identifies the indicators that will be used to measure progress, and the frequency with which air quality information will be reported.

Appendix A provides information about local air pollution sources, the status of air quality indicators identified in the last Air Quality Action Plan, and recent survey data on citizen perspectives on air quality. Appendix B gives a brief history of the Air Quality Plan. Appendix C presents the City Council resolution which adopted the air quality policies.

¹ 2004 City Plan Update, page 89.

1.2 FORT COLLINS ROLE IN PROTECTING AIR QUALITY

The City of Fort Collins should have an air quality plan for two important reasons. First, City residents have high expectations for a clean environment. Second, certain air quality problems and opportunities are best handled at the local government level. Survey data and public outreach repeatedly show that residents rank air quality concerns among the high-priority issues for our community. In fact, residents identified the Air Quality Program as the single most important program for protecting their future quality of life, according to the 2003 Community Survey. They also believe the City has a responsibility, along with federal, state, and local health agencies, to maintain and improve air quality.

The City of Fort Collins' Air Quality Program compliments federal and state programs. The federal Clean Air Act (CAA) provides the structure for air quality control nationally. It defines outdoor-air standards, and requires air quality monitoring and improvement in non-attainment areas (areas that do not meet the standards). The federal role assures eventual compliance with outdoor-air standards, but it is inflexible and addresses only a handful of pollutants. Colorado state government is responsible for efforts to attain the federal outdoor-air standards. The state adopts and enforces regulations that limit smokestack and tailpipe emissions, regional haze, the use of prescribed fire, street sanding and acid deposition. Larimer County provides local enforcement of state air pollution regulations.

Gaps in federal, state, and county programs can be filled by city programs. Innovations that are developed through local experimentation can be shared with other communities and state and federal agencies. And some air quality concerns can only be addressed at the local level.

The following examples illustrate the City's role in air quality protection.

- **Wood Smoke.** Wood smoke from stoves and fireplaces impacts City residents directly because it's in their neighborhoods, i.e., up-close and personal. Federal and State agencies responded by requiring that new wood stoves meet strict emission standards. This strategy keeps the problem from getting worse and gradually reduces emissions as old stoves wear out and are replaced by lower-emitting ones. To complement this long-term approach, the City helps neighborhoods to resolve wood-smoke complaints, advises stove and fireplace users how to burn wood with the least possible smoke, and encourages replacement of older units through zero-interest loans. The City has also adopted regulations governing solid fuel (clean, dry, untreated wood only), banning new fireplaces, limiting smoke density, and making new stove standards enforceable through the City's building code.
- **Ozone-depleting Compounds.** The City became concerned that the global impact of ozone-depleting compounds such as refrigerants were not being addressed by federal and state agencies. So Fort Collins joined with the Cities of Denver and Boulder to adopt identical, local regulations requiring the capture and recycling of ozone-depleting compounds. Fort Collins' ordinance was designed to sunset if and when the state regulated such compounds. The state has since adopted such regulations, which are enforced by the County Health Department.

- **Global Warming.** Concerns about the impact that global warming could have on local government and about the failure of the federal and state agencies to address global warming lead the City to partner with the International Council for Local Environmental Initiatives to curb greenhouse gases locally. The City, along with 578 other local governments to date, joined the Cities for Climate Protection Campaign and adopted a local action plan containing a greenhouse gas reduction target and a detailed implementation plan to achieve it.
- **Tailpipe Emissions.** One of the strongest federal/state roles has been in reducing tailpipe emissions. The federal new motor vehicle control program has reduced emissions by over 90% since 1965, and the state's emissions testing program has helped to curb excess emissions attributable to needed maintenance. The City complimented these efforts by boosting participation of students and commuters in the emissions testing program, helping to train automotive technicians to diagnose and repair emissions problems, and researching ways to encourage vehicle repair through incentives. The City seeks to reduce emissions from its own vehicle fleet by purchasing alternative-fuel and low-emission vehicles.
- **Transportation Demand Management.** Travel demand management and improving traffic flow is primarily the responsibility of local government. The City's comprehensive plan, City Plan, creates a vision of a city where travel by transit, walking and cycling are more attractive, and vehicle travel is less necessary, than they are today. The Transportation Master Plan provides for investment in alternative travel modes and the City's SmartTrips program encourages residents to utilize them. Engineering and traffic operations managers are tireless in their effort to move traffic efficiently, which helps lower tailpipe emissions further.
- **Radon.** Health risk from exposure to indoor radon has engendered a federal-state-local partnership. Based on guidelines and recommendations from the federal level, and with grant support and encouragement from the state, the City has addressed radon in a number of ways. These include research on local radon levels, public education to encourage home testing and remediation, low-cost test-kit sales, assuring that homebuyers are advised about radon, and requiring that new homes be built radon-resistant (ordinance pending).
- **Secondhand Smoke.** Health risk from exposure to tobacco smoke spawned another partnership. Local health authorities and citizen groups targeted tobacco smoking as a priority issue. The City played a role in reducing exposure to second-hand smoke by restricting smoking in public places.

In sum, Fort Collins Air Quality Plan:

- Responds to a strong citizen mandate for the City to protect and improve air quality,
- Compliments and fills gaps left by federal, state, and county efforts,
- Provides a long-term planning framework for air quality protection,
- Recognizes and coordinates the efforts of several City departments, and
- Allows flexibility to respond to emerging issues.

1.3 AIR QUALITY PLANNING APPROACH

1.3.1 Conceptual Approach - Focus on Sources Rather Than Pollutants

The Air Quality Plan emphasizes emission reductions rather than ambient air quality standards and emphasizes key sources rather than key pollutants. This approach will be further detailed below.

It is instructive to first consider some history about the “traditional” approach to air quality planning. The federal Clean Air Act calls for U.S. EPA to set "National Ambient Air Quality Standards" for six pollutants. The states are required to implement emission reduction strategies tailored to bring ambient air quality in line with the standard throughout the state. Standards are based on available health effects data and are designed to "protect the public health with an adequate margin of safety." Six pollutants have ambient air quality standards: carbon monoxide, particulate matter, ozone, nitrogen dioxide, sulfur dioxide, and lead. If air quality in the state is worse than the federal standard, the state is required to submit a "State Implementation Plan" to specify how it will attain the standards.

Today, however, we are confronted with new pollutants for which the old model (ambient standard followed by implementation plan) does not fit. For example:

- Air toxics** include many compounds that are known to contribute to cancer or respiratory disease but that do not have individual ambient air quality standards.
- The **Brown Cloud** (visibility reduction) is primarily an aesthetic issue, although some components of the Brown Cloud can also affect health.
- Carbon dioxide** and other **greenhouse gasses** are important to the global environment but do not directly cause local health effects. An ambient air quality standard would not be meaningful; rather a limit on total global carbon dioxide emissions is desired.

We are also confronted with sources that emit several kinds of air pollution at once. For example, wood burning stoves and fireplaces produce carbon monoxide, particulates, air toxics, and contribute to the Brown Cloud. Similarly, automobiles produce all of these and greenhouse gasses as well. If we were to follow the traditional approach and write separate control plans for each pollutant, they would overlap to a high degree.

Furthermore, it is important to recognize the strengths and limitations of local government. The City of Fort Collins is not in a good position to monitor air quality for several new pollutants, nor could we credibly adopt our own local ambient air quality standards based on health effects research. What the City can do effectively is adopt policies and programs that reduce emissions from specific sources or source categories.

Because of the circumstances noted above, the Fort Collins Air Quality Plan was developed using a source reduction approach that is more suited to the City's role in air quality protection.

1.3.2 Plan Development Process

The City followed the steps outlined below to develop the Air Quality Plan. This planning approach has several advantages -- it is simple, direct, action-oriented, sets priorities, and takes advantage of the strengths and flexibility of local government.

1. Assess current situation and status of air quality indicators.
In early 2003, data on the air quality indicators defined in the 2000-2003 Air Quality Action Plan were compiled. This information is presented in Appendix A.
2. Identify key pollutants
In mid 2003, staff worked with the Air Quality Advisory Board Sub-Committee to select the list of pollutants to prioritize. A summary of current information was compiled for each pollutant. Air quality staff and the Air Quality Advisory Board conducted a forced-choice pairing exercise to identify priority pollutants. Ozone, fine particles, mobile source hazardous air pollutants, and greenhouse gases were identified as high priority pollutants. Indoor air pollutants, nitrogen oxides, PM₁₀, industrial hazardous air pollutants, and carbon monoxide were identified as medium priority pollutants. Section 2.1 of this plan provides more information on this process.
3. Identify key air pollution sources
During 2004, staff worked to compile updated emission inventory information, presented in Appendix A, Section 4 of this plan. Existing emissions inventory data are not comprehensive or consistent, making it difficult to accurately assign air pollutants to source categories. However, results generally indicate that local air pollution sources remain as:
 - # 1 – Motor vehicles
 - # 2 - Commerce and Industry
 - # 3 – Residences
4. Adjust policies to reflect pollutant and source priorities.
Air quality policies pertaining to transportation and land use were reviewed first, in coordination with updates to City Plan and Transportation Master Plan. The remaining air quality policies (dealing with commercial and residential sources, indoor air quality, health, etc.) were reviewed during the fall and winter of 2003. Recent survey data about citizen perspectives on air quality issues were reviewed and considered.

Most of the original air quality policies received only minor edits or reformatting. A few policies that were outdated or had not previously been implemented were dropped. Where policy gaps were noted, new policies were proposed (i.e. non-road emissions, efforts to reduce ground level ozone precursors, and a policy identifying the City's approach to addressing air quality-related health issues.) Input was received from the public, staff, consultants, relevant Council advisory boards, and City Council before these policies were revised.

5. Design action strategies to achieve the air quality policies.
Broad action strategies for achieving the policies were then identified. The 2000-2003 Air Quality Action Plan was closely scrutinized for appropriate strategies to carry forward. Internet-based research was conducted, and new ideas were gathered from technical experts and from various City Council advisory boards.
6. Establish air quality indicators to measure progress in achieving air quality policies.
Lastly, indicators were identified to help evaluate progress in achieving the policies. Many factors went into the consideration of indicators, including availability of data, cost of collecting new data, and what the data really indicate. One of the “EnLibra Principles”, shown below, was considered in the indicator selection process. (The EnLibra Principles were developed by the Western Governors Association to embrace balance and stewardship in the protection of air, land and water.)

Reward Results, Not Programs – Move to a Performance-based System

A clean, safe environment will best be achieved when government actions are focused on outcomes, not programs, and when innovative approaches to achieving desired outcomes are rewarded. Federal, state, and local policies should encourage “outside the box” thinking in the development of strategies to achieve desired outcomes. Solving problems rather than just complying with programs should be rewarded.

Efforts were made to select indicators that measured true air quality benefits, rather than just program metrics. For example, measures of program performance such as number of brochures distributed or number of homes mitigated for radon do not directly identify whether an air quality benefit has been achieved. At the same time, discretion had to be exercised regarding the cost of collecting indicator data. Consequently, this plan contains a relatively small number of indicators. The Plan also identifies the need to formulate more meaningful indicators to help the City assess the true effectiveness of its air quality protection efforts.

1.3.3 Public Input

Efforts were made throughout the development of this plan to involve affected interests. Numerous meetings were held with various City staff and consultants to the City Plan and Transportation Master Plan updates. Air quality staff participated in the City Plan and Transportation Master Plan update processes which each had public outreach elements. A City Plan citizen’s advisory committee met to give input about City Plan from August 2002 to October 2003, several open houses were held and citizens were invited to comment on a website.

Council advisory boards (Air Quality, Transportation, and Natural Resources) had opportunities to provide input to the Air Quality Plan at various points in the process. A Sub-Committee of the Air Quality Advisory Board was formed in April 2003, and met five times to provide input throughout the plan development.

General public input was sought via the Internet in March and April 2004. Announcements about the Web-based comment opportunity were published in the May *City News* utility bill insert, and via a press release. More than 150 direct postcard mailings announcing the Web comment opportunity were sent to the following interest groups:

- Interested citizens
- Other local governments
- Environmental groups
- Health experts
- Wood Smoke Complaint Line participants
- Local air quality consulting firms
- Technical experts
- Construction firms
- Bicycle retailers
- Auto repair shops
- Lawn and garden equipment retailers
- Wood stove retailers
- Radon testers and mitigators
- Home builders
- Board of Realtors

2.0 PRIORITIZING POLLUTANTS AND SOURCES

2.0 PRIORITIZING AIR POLLUTANTS AND SOURCES

In the last decade, air pollution has been improving in Fort Collins, thanks in large part to federally mandated controls of air pollution emissions. Whereas Fort Collins violated the federal carbon monoxide standard throughout the 1980's, we are now well in compliance with that standard. We currently do not violate any of the National Ambient Air Quality Standards.

However, ground level ozone is one major exception to the improvement trend. Ozone levels have remained flat over the past two decades, with an increasing trend over the past four years. In fact, Fort Collins exceeded (not violated, due to how compliance is calculated) the new 8-hour ozone standard during the summer of 2003. Consequently, the City has joined with regional and state partners in shifting focus to work on reducing precursor emissions that form ground level ozone.

Visibility, a measure of how the air looks, has seen minor improvements in Fort Collins in recent years, but we still violate the state's guideline visibility standard one in four days each year. In city surveys, residents consistently express concerns about "Brown Cloud" in Fort Collins at certain times of year.

Information on Fort Collins' ambient pollution concentrations, air quality indicators, emission inventories and trends are presented in Appendix A, along with summaries of recent citizen perspectives on air quality. This information was used, in part, to prioritize air pollutants and pollution sources. This process is discussed in further detail in the following sections.

2.1 Priority Air Pollutants

In the summer of 2003, air quality staff (6) and Air Quality Advisory Board members (6) undertook an exercise to rank the priority of air pollutants to aid in updating the air quality policies and strategies for Fort Collins. Staff developed the list of pollutants to be ranked, and reviewed it with the Air Quality Board Subcommittee working on the plan. One page of information about each pollutant was compiled and considered in the exercise. The following guidelines were used in the ranking exercise:

- 1) **Health effects** have priority over non-health effects (such as aesthetics or crop yield).
- 2) For pollutants with a standard, current **non-compliance** has priority over those in compliance.
- 3) Pollutants **widely perceived as a problem in Fort Collins** have priority over unknown pollutants.
- 4) Pollutants with an **upward or uncertain emission trend** have priority over those with a downward emission trend.

Fourteen air pollutant categories were ranked using a "Forced Choice" method that requires selecting the higher priority pollutant of a pair, for every possible set of pairs. The overall priority is determined by the number of times a pollutant was selected as

higher priority of a given pair. The division between High, Medium, and Low priority was determined by staff and Air Quality Board consensus using logical breaking points. Table 2.1 shows the final results.

Table 2.1 2004 Fort Collins Priority Air Pollutants

Pollutant	SUM	Priority
Ozone	127	High
Fine particles (PM_{2.5})	124	High
Mobile Source Hazardous Air Pollutants	122.5	High
Greenhouse Gases	103.5	High
Indoor Air Pollutants	90	Medium
Visibility	88	Medium
Nitrogen Oxides	80	Medium
PM₁₀	78	Medium
Industrial Hazardous Air Pollutants	75	Medium
Carbon Monoxide	73	Medium
Sulfur Dioxide	35	Low
Acid Deposition	33	Low
Lead	33	Low
Chlorofluorocarbons (CFC's)	30	Low

2.2 Priority Air Pollution Sources

Motor vehicles remain as the number one source of local air pollution, as illustrated by Table 2.2 on the next page. Within the next ten years, it is possible that non-road mobile sources will take over as the number one contributor to local air pollution, as discussed in Appendix A, Section 5.2 of this plan.

Commercial and industrial sources are considered to be the second largest source of air pollution in Fort Collins. The Colorado Air Pollution Control Division evaluates and develops air permits for stationary sources in Colorado. They inspect sources to determine compliance with air regulations and permit conditions, and maintain a computerized inventory of air pollution emissions throughout the state. The City of Fort Collins has 172 permitted commercial air pollution sources.

Collectively, residences are considered to be the third largest source of air pollution in Fort Collins. Residences can emit wood smoke into the outdoor air. Other residential activities, such as using and storing paints, cleaners, transferring fuel, using lawn and garden equipment and patio grills can allow harmful VOC's to escape into the atmosphere. In addition, human exposure to indoor air pollution inside residences can

occur. On average, humans spend 90% of their time indoors, and receive the majority of air pollution exposure indoors.

Table 2.2 Priority Fort Collins Emissions Sources

Priority of Air Pollutants	Pollutant	Pollutant SOURCES			
		Motor Vehicles	Commerce & Industry	Residences	Other
High	Ozone --- VOC ¹	29%	45 %	26 %	
High	Fine Particles ²	78 %	10 %	8 %	4 %
High	Mobile Source HAPS	100 %	0 %	0 %	0 %
High	Greenhouse Gases ³	34 %	42 %	24 %	0 %
Medium	Indoor Air Pollutants	--- --- EXPOSURE --- --- ---			
Medium	Visibility Reduction ²	78 %	10 %	8 %	4 %
Medium	NOx ¹	43 %	56 %	1 %	
Medium	PM10 ¹	27 %	69 %	3 %	
Medium	Industrial HAPS ¹		100 %		
Medium	Carbon Monoxide ⁴	84%	12 %	4 %	0 %
SUM of Percentages		473	344	74	8

¹ 2001 Emissions Inventory of Larimer County

² North Front Range Air Quality Study; Fort Collins winter 1996 data

³ City of Fort Collins 2001/2002 Climate Protection Status Report

⁴ 2002 Fort Collins CO Maintenance Plan, data for 2005

3.0 AIR QUALITY POLICY

3.0 AIR QUALITY POLICY

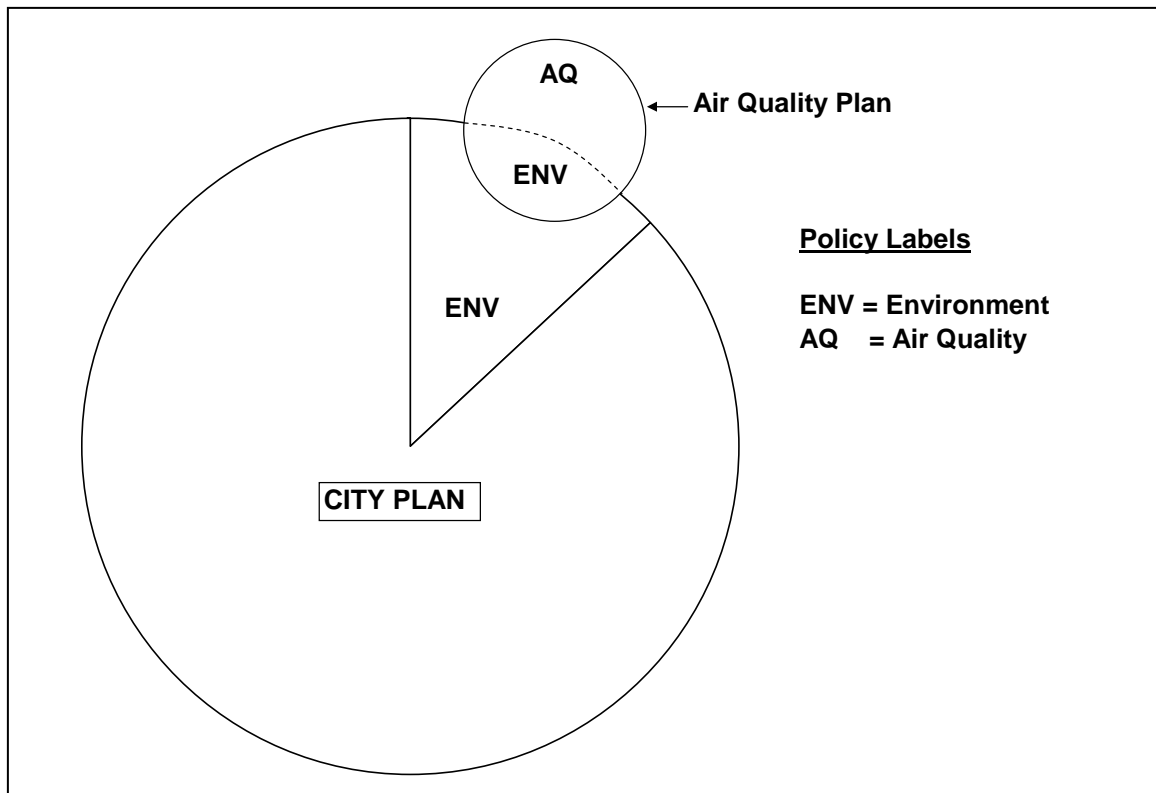
3.1 Organization

The City of Fort Collins Air Quality Plan is an element of City Plan, the City’s Comprehensive Plan, and as such provides the primary guidance for the City’s air quality protection efforts. A subset of air quality principles and polices that relate to land use and transportation are contained in City Plan, and are reiterated in this Air Quality Plan. Those policies are labeled “ENV”, exactly as they appear in City Plan.

The Air Quality Plan also supplements City Plan by identifying additional air quality policies that address commercial and residential sources, indoor air quality and health protection. These air quality policies, not contained in City Plan, are labeled “AQ”. The relationship between air quality policies is illustrated in Figure 3.1

All air quality principles and policies are contained in this Air Quality Plan. City Council adoption of this chapter constitutes Council adoption of all policies contained herein.

Figure 3-1. Air Quality Plan is an element of City Plan



3.2 AIR QUALITY VISION, GOALS, PRINCIPLES AND POLICIES

This chapter of the Air Quality Plan states all the air quality visions, goals, principles, and policies, including some repeated in City Plan (labeled ENV) and some only contained in this Air Quality Plan (labeled AQ).

[A note on definitions: As used in City Plan, a “goal” is both a beginning point for City efforts and an end towards which effort will be directed. Goals guide the community’s decisions about investment, development, and redevelopment, and act as milestones as progress is made towards the community vision. A “principle” is a general or fundamental rule, doctrine, or assumption. A “policy” is a definite course or method of action selected to guide and determine present and future decisions.]

3.2.1 Air Quality Vision and Goals

Our community will continually improve air quality as the city grows by applying strong, comprehensive policies and strategies to address air quality issues.

The City will strive to reduce tailpipe emissions through clean technologies and by reducing the rate of vehicle miles traveled (VMT) by promoting a multi-modal transportation system that offers choices. The City will continue to invest in transit, walking, and cycling capacity and encourage residents to use alternative travel modes, to help shift travel choices toward alternatives that reduce air pollution and traffic congestion.

3.2.2 Air Quality Principles and Policies

[A note on numbering: Some of the principles and policies below are also contained in City Plan. These have an ENV- prefix and retain the numbering that they have in the City Plan document. The remaining principles and policies have an AQ- prefix.]

PRINCIPLE ENV-1: Continually improve Fort Collins’ air quality as the city grows.

Policy ENV-1.1 Air Quality Plan. The City will adopt and implement a comprehensive Air Quality Plan that addresses the following issues:

- Emissions from vehicles
- Emissions from commerce and industry
- Wood burning
- Visual air quality
- Certain indoor air pollutants and greenhouse gases

Policy ENV-1.2 City-Wide approach. The City's primary approach to improving air pollution is to reduce total city-wide emissions over the long term. The City's secondary approach is to assure that localized air pollution exposures conform to adopted health standards.

Policy AQ-1.3 Pollution Prevention. The City will promote prevention of air pollution at its source as the highest priority approach in reducing air pollution emissions.

Policy AQ-1.4 Priority Pollutants. The City will focus its efforts on reducing high priority air pollutants including ozone, fine particles, mobile source hazardous air pollutants, and greenhouse gases, followed by efforts to reduce medium priority pollutants including indoor air pollutants, nitrogen oxides, PM₁₀, industrial hazardous air pollutants, and carbon monoxide.

Policy AQ-1.5 Toolbox of Approaches. The City will seek to achieve local air quality goals through education, incentives and price mechanisms, and regulation.

Policy AQ-1.6 Measurement. The City will measure, review, and report the progress of key air quality indicators at least twice prior to the next update of the Air Quality Plan to determine whether action strategies are having the desired effect or need to be amended.

Policy AQ-1.7 Air Quality Information. The City will report available air quality information to the public on a frequent and regular basis. The City will assist citizens in finding existing air quality information that is of interest to them.

Policy AQ-1.8 Enforcement. The City will support the provision of adequate responsibility, authority, and resources (funding and personnel) to agencies charged with the enforcement of federal, state, county, and local air quality regulations.

Policy AQ-1.9 Local Authority. The City will oppose any action of the State Legislature that restricts local government authority to improve air quality beyond minimum State requirements, even as the City recognizes and supports the vital role of the State of Colorado in improving air quality.

PRINCIPLE ENV-2: The City will reduce total motor vehicle emissions of high priority pollutants by focusing on both technology (tailpipe emissions) and behavior (driving patterns).

Policy ENV-2.1 Actions on Vehicle Miles Traveled. The City will slow the growth of vehicle-miles of travel by employing strategies that reduce vehicle trip rates, reduce vehicle trip length, and increase vehicle occupancy.

Policy ENV-2.3 Price Mechanisms. The City will use price mechanisms of the free market to help shift citizen and business choices toward actions that reduce vehicle miles traveled, including identifying and removing hidden cost subsidies to motor vehicle users, employing economic incentives and disincentives, and other market approaches.

PRINCIPLE AQ-12. The City will reduce tailpipe and evaporative emissions from highway and non-road mobile sources.

Policy ENV-2.4 Actions on Tailpipe Emissions. The City will employ strategies to reduce per-mile emissions such as promotion of car maintenance, mechanic training, encouraging use of alternative fuels, purchasing clean vehicles, use of clean lawn and garden equipment, prohibition of smoking vehicles, consideration of a local emissions testing and repair program, and reducing traffic delays.

Policy AQ 12-1. Non-Road Emissions. The City will employ incentive programs and other strategies to reduce emissions from lawn and garden equipment, small and large construction equipment, and other non-road engines.

PRINCIPLE ENV-3. By 2010 the City will reduce greenhouse gas emission 30% below predicted worst-case 2010 levels in order to reduce the impact of the Fort Collins community on global warming.

Policy ENV-3.1. Local Action Plan. The City will adopt and implement a local action plan to reduce greenhouse gas emissions.

Policy ENV-3.2. Biennial Report. The City Manager will prepare a biennial report outlining the City's progress on achieving its greenhouse gas reduction goal and recommending future actions.

PRINCIPLE AQ-13. The City will reduce commercial and industrial emissions in the Fort Collins area, focusing on priority pollutants.

Policy AQ-13.1 Business Assistance. The City will offer programs and assistance to local businesses interested in reducing their environmental impacts such as the voluntary business Climate Wise program.

PRINCIPLE AQ-14. The City will reduce residential emissions of priority pollutants in the Fort Collins area.

Policy AQ 14-1. Residential Wood Smoke. The City will reduce wood smoke emissions and the number of non-certified wood stoves and fireplaces in the Fort Collins area by, for example, insuring compliance with existing regulations, promoting alternatives to wood burning, and helping to resolve neighborhood wood smoke conflicts.

Policy AQ-14.2 Ozone Reduction. The City will reduce evaporative emissions associated with residential activities (lawn mowing, fueling, paint selection and storage) by, for example, educating citizens and providing incentives.

PRINCIPLE AQ-15. Recognizing the strong relationship between air quality and human health, the City will, within the scope of its ability, strive to protect and improve the air so it is healthy to breathe and free of levels of pollutants that harm human health.

Policy AQ-15.1 Health Partnerships. The City will solicit the cooperation and active participation of a diverse range of knowledgeable health professionals and members of the environmental health community to guide the development of policies so that they reflect priority health issues.

Policy AQ-15.2. Seek Solutions. The City will work to protect air quality by seeking solutions to high priority health-related air quality issues using already adopted health standards.

Policy AQ-15.3 Air Toxics Coordination. The City will work with County, State and Federal health officials to reduce the health risks posed by toxic air pollutants.

Policy AQ-15.4 Indoor Air Quality. Because indoor air pollution can be a serious issue, the City will educate and encourage its residents to reduce their exposure to indoor air pollution.

PRINCIPLE AQ-16. The City will lead by example in efforts to improve local air quality.

Policy AQ-16.1 Lead by Example. The City will make efforts to reduce and mitigate its own air pollution emissions before asking or requiring others to reduce and mitigate their emissions.

Policy ENV-2.2 Actions on VMT. To reduce VMT, the City will encourage its customers to use telephone, Internet, or other methods to register for City offerings and purchase tickets. The City will also minimize the need for driving by organizing offerings with a neighborhood focus, so participants don't have to travel long distances.

Policy AQ-16.2. Cooperation. The City will initiate and cooperate with other efforts to improve air quality, while avoiding unproductive duplication of effort. Others include government entities (other City departments, county, regional, state, national, global), the non-profit sector, businesses, and educational institutions.

Policy AQ-16.3 Innovations. The City will consider adoption of successful air quality improvement strategies in effect elsewhere, including municipal practices, public information campaigns, incentives and price mechanisms, and regulations.

3.3 RELATED VISION, GOALS, PRINCIPLES, AND POLICIES

This section restates other City Plan visions, goals, principles, and policies that, while not considered specific “air quality” policies, do support air quality improvement.

3.3.1 Related Vision and Goals

Because most air pollution comes from motor vehicles, City Plan recognizes the importance of land use and transportation policies in helping to address air pollution from motor vehicles. These supporting policies are summarized in the following excerpt from the City Plan Community Vision:

Fort Collins will confront and mitigate the negative impact of cars on our lives.

The vision recognizes the importance of the automobile as a means of transportation, but begins to shift the balance towards a future in which different modes of transportation are also used. Our community will have an overall transportation systems and urban form that supports a wide choice and efficient ways to travel, thereby reducing the rate of growth of total daily vehicle miles of travel (VMT). Our Master Street Plan and Capital Improvement Program will support the land use goals of the City. New development and redevelopment will be organized and woven into a compact pattern that is conducive to pedestrian, bicycle, and public transit travel. All modes of travel will be safe and efficient. And, the importance of our community’s air quality, transportation, and land use goals will be balanced.

Air quality is also listed among other issues in the City’s overall vision for the environment:

Our community will be a responsible steward of the natural environment, such as improving air quality, water quality, conserving resources, and reducing solid waste.

3.3.2 Related Principles and Policies

[Note: Within City Plan, LU refers to Land Use principles and policies, CAD refers to Community Appearance and Design principles and policies, and T refers to Transportation principles and policies.]

PRINCIPLE LU-1: Growth within the City will promote a compact development pattern within a well-defined boundary.

Policy LU-1.1 Compact Urban Form. The desired urban form will be achieved by directing future development into mixed-use neighborhoods and districts while reducing the potential for dispersed growth not conducive to pedestrian and transit use and cohesive community development.

PRINCIPLE LU-3: The *City Structure Plan* will be used to provide a geographic depiction of how these *City Plan Principles and Policies* are applied throughout the City.

[Note: The Structure Plan focuses on the physical form and development pattern of the city. It calls for a compact development pattern, directing urban development into well-defined areas at higher densities. An expanded transit system is incorporated in the Structure Plan, designed to provide high-frequency transit services along major travel corridors, with feeder transit lines providing connections from all major districts within the city. It establishes new activity centers in transit-served areas that serve as focal points and centers of activity, including Downtown and other mixed-use areas. The Structure Plan facilitates multiple means of travel: pedestrians, bicycles, and transit as well as cars and trucks. Street standards and site planning requirements will ensure that neighborhoods and districts throughout the city will be connected and accessible by all travel modes.]

PRINCIPLE CAD-1: Each addition to the street system will be designed with consideration to the visual character and the experience of the citizens who will use the street system and the adjacent property. Together, the layout of the street network and the streets themselves will contribute to the character, form, and scale of the city.

PRINCIPLE CAD-2: Public spaces, such as plazas, civic buildings, outdoor spaces, parks, and gateway landscapes should be designed to be functional, accessible, attractive, safe, and comfortable.

PRINCIPLE T-1: The physical organization of the City will be supported by a framework of transportation alternatives that balances access, mobility, safety, and emergency response throughout the City, while working towards reducing the rate of growth of vehicle miles traveled and dependence on the private automobile.

Policy T-1.1 Land Use Patterns. The City will implement land use patterns, parking policies, and demand management plans that support effective transit, an efficient street system, and alternative modes. Appropriate residential densities and non-residential uses should be within walking distance of transit stops, permitting public transit to become a viable alternative to the automobile.

Policy T-1.2 Multi-Modal Streets. Street corridors will provide for safe, convenient, and efficient use of all modes of travel, including motor vehicles, transit, bicycles, and pedestrians.

Policy T-1.6 Level of Service Standards. The City will prepare and adopt level of service standards for automobiles, bicycles, pedestrians, and transit.

PRINCIPLE T-2. Mass transit will be an integral part of the city’s overall transportation system.

PRINCIPLE T-3. City transportation programs shall address themselves to reduce vehicle miles of travel through strategies that reduce trip generation, reduce trip length, and increase vehicle occupancy.

Policy T-3.1 Demand Management. The City will promote travel demand reduction measures that reduce automobile trips and promote alternative travel modes in which results can be measured – such as telecommuting and in-home businesses, electronic communications, variable work weeks, flextime, transit access, bicycle and pedestrian amenities, parking management, and trip reduction programs for large employers.

PRINCIPLE T-4. Bicycling will serve as a practical alternative to automobile use for all trip purposes.

PRINCIPLE T-5. The City will acknowledge pedestrian travel as a practical transportation mode and elevate it in importance to be in balance with all other modes. Direct pedestrian connections will be provided from places of residence to transit, schools, activity centers, work and public facilities.

PRINCIPLE T-9. Private automobiles will continue to be an important means of transportation.

Policy T 9.1 Vehicle Miles Traveled (VMT): The City will continually strive to reduce the growth rate in VMT by implementing a VMT reduction program that strives to meet or exceed the performance of similar programs in comparable cities.

PRINCIPLE T-10. The City will participate in a coordinated, regional approach to transportation planning.

PRINCIPLE ENV-5. Energy efficiency and use of renewable energy resources will be encouraged, facilitated, and regulated in both the public and private sector through information and educational services, incentive programs, requirements, and enforcement of regulations such as the Energy Code.

PRINCIPLE ENV 9. The City will continue to develop and implement sustainability practices that address long-term social, environmental, and economic considerations of the Fort Collins community.

PRINCIPLE ENV-10: The City will apply cost-effective pollution prevention and zero-waste strategies that will help protect all environmental resources, including air, soil, and water and accelerate the community's ability to meet the City's adopted goal of diverting 50% of the waste stream from disposal in landfills by 2010.

4.0 IMPLEMENTATION STRATEGIES

4.0 IMPLEMENTATION STRATEGIES

The Air Quality Plan is a policy and strategic planning document intended to serve as a guide for the City's efforts to protect air quality over the next five years. The strategies discussed in this section lay a broad framework for the implementation of air quality policies. They provide a basis from which biennial budget recommendations are developed. They are not, however, intended to represent a complete work plan. More detailed annual work plans will be developed and reviewed internally for fit with overarching air quality objectives.

4.1 Focus of Efforts

The City's Air Quality Plan continues to focus most action strategies on "sources" of air pollution, not individual pollutants. In that way, multiple benefits can be gained from attention to one source. Examples of action strategies that focus on one source and multiple pollutants include VMT reduction, promoting vehicle maintenance, vehicle emissions testing, reducing vehicle idling, reduced wood-burning, pollution prevention and green building efforts.

Some efforts may focus on a particular pollutant, but reductions still result in multiple air quality benefits. One example is the voluntary Climate Wise business program. While the focus here is on achieving and documenting greenhouse gas reductions, any actions that reduce fossil fuel combustion also reduce other air pollutants.

The Air Quality Plan also contains some strategies that target reductions in specific pollutants. Examples include actions intending to reduce human exposure to radon, and ozone education and incentive programs such as the "Stop at the Click" and the "Lawn Mower Trade Out", aimed at reducing Volatile Organic Compounds (VOC's).

4.2 Air Quality Strategies

The City of Fort Collins Natural Resources Department has the primary responsibility for implementing actions to achieve the City's air quality principles and policies. Table 4.1 identifies broad actions areas to be implemented by Natural Resources Department staff. In this table, strategies are matched with policies.

Table 4.1 Air Quality Strategies

Policy / Strategy	Suggested Time Frame
Policy ENV-1.1 Air Quality Plan. The City will adopt and implement a comprehensive Air Quality Plan.	
<ul style="list-style-type: none"> Update the Air Quality plan every five years. 	2009
Policy ENV 1.2 City-Wide approach. The City's primary approach to improving air pollution is to reduce total city-wide emissions, over the long term. The City's secondary approach is to assure that localized air pollution exposures conform to adopted health standards.	
<ul style="list-style-type: none"> Evaluate hotspot potential for violation of air pollution standards. 	2004
Policy AQ-1.3 Pollution Prevention. The City will promote prevention of air pollution at its source as the highest priority approach in reducing air pollution emissions.	
<ul style="list-style-type: none"> Develop and implement a Sustainability Action Plan 	2004-2005
<ul style="list-style-type: none"> Explore enhanced pollution prevention opportunities with community partners (such as the Chamber of Commerce). 	2005-2006
Policy AQ-1.6. Measurement. The City will measure, review, and report the progress of key air quality indicators at least twice prior to the next update of the Air Quality Plan to determine whether action strategies are having the desired effect or need to be amended.	
<ul style="list-style-type: none"> Prepare biennial Air Quality Indicators Report 	2005,2007
<ul style="list-style-type: none"> Conduct biennial air quality survey to gather data on citizen views, actions, and emissions. 	'04, '06, '08
<ul style="list-style-type: none"> Evaluate performance of peer cities' VMT reduction programs and compare with Fort Collins program performance. 	2005, 2008
Policy AQ-1.7 Air Quality Information. The City will report available air quality information to the public on a frequent and regular basis. The City will assist citizens in finding existing air quality information that is of interest to them.	
<ul style="list-style-type: none"> Prepare Annual Ambient Air Quality Report 	Annually
<ul style="list-style-type: none"> Maintain air quality City Web pages to inform the public. 	On-going
Policy AQ-1.9 Local Authority. The City will oppose any action of the State Legislature that restricts local government authority to improve air quality beyond minimum State requirements, even as the City recognizes and supports the vital role of the State of Colorado in improving air quality.	
<ul style="list-style-type: none"> Provide input on relevant bills at the State Legislature 	On-going
Policy ENV-2.1 Actions on Vehicle Miles Traveled. The City will slow the growth of vehicle-miles-of travel by employing strategies that reduce vehicle trip rates, reduce vehicle trip length, and increase vehicle occupancy.	
<ul style="list-style-type: none"> Conduct pilot Community Readiness study to identify the community's readiness to embrace vehicle miles traveled (VMT) reduction efforts, followed by implementation of recommendations. 	Start 2004
<ul style="list-style-type: none"> Foster integrated solutions to land use, transportation, and air quality problems. 	On-going

Policy / Strategy	Suggested Time Frame
<ul style="list-style-type: none"> Evaluate whether a car-sharing program (where members have access to a fleet of local vehicles, but do not own the vehicles) would benefit Fort Collins' air quality. 	2005 or later
<ul style="list-style-type: none"> Evaluate an Episodic Controls Program to establish high-pollution episodes based on visibility readings. The public would be informed of episodes and offered incentives to reduce driving (reduced bus fares, promotion of telework, etc.) 	2005 or later
<ul style="list-style-type: none"> Participate in regional transportation planning efforts to promote choices that improve air quality (i.e. the North I-25 Corridor Environmental Impact Statement). 	As needed
<ul style="list-style-type: none"> Promote air quality education at schools; Facilitate teacher training (Clean Air Trunk; Cars, Cures, Cultures curricula) 	On-going
<ul style="list-style-type: none"> Partner with SmartTrips to promote VMT reduction at schools. 	On-going
<ul style="list-style-type: none"> Use the results of the peer cities VMT program study to reduce performance gaps in Fort Collins program, if any exist. 	2006 +
<p>Policy ENV-2.3 Price Mechanisms. The City will use price mechanisms of the free market to help shift citizen and business choices toward actions that reduce vehicle miles traveled, including identifying and removing hidden cost subsidies to motor vehicle users, employing economic incentives and disincentives, and other market approaches.</p>	
<ul style="list-style-type: none"> Explore and implement price mechanisms of the free market to reduce VMT and single occupancy vehicle use. 	On-going
<p>Policy ENV-2.4 Actions on tailpipe emissions. The City will employ strategies to reduce per-mile emissions such as promotion of car maintenance, mechanic training, encouraging use of alternative fuels, purchasing clean vehicles, use of clean lawn and garden equipment, prohibition of smoking vehicles, consideration of a local emissions testing and repair program, and reducing traffic delays.</p>	
<ul style="list-style-type: none"> Promote use of alternative fuels and technology that improve air quality. Consider a regional workshop to evaluate the economics, availability of fuels, and feasibility of increasing alternative fueling infrastructure (i.e. BioDiesel and low sulfur fuel). 	On-going
<ul style="list-style-type: none"> Work to retain an emissions testing program that cost-effectively identifies and repairs high polluting vehicles. 	2004, 2005
<ul style="list-style-type: none"> Conduct public education about the impacts of vehicle emissions, importance of car maintenance, benefit of purchasing of low emission fuel-efficient vehicles, and reduced idling. 	On-going
<ul style="list-style-type: none"> Promote automotive technician training. 	On-going
<p>Policy AQ 12-1. Non-Road Emissions. The City will employ strategies such as incentive programs to reduce emissions from lawn and garden equipment, small and large construction equipment, and other non-road engines.</p>	
<ul style="list-style-type: none"> Conduct incentive-based programs to reduce emissions from non-road sources such as a lawn mower rebate program. 	On-going
<ul style="list-style-type: none"> Evaluate City procurement guidelines for products and services that 	2005 -

Policy / Strategy	Suggested Time Frame
would reduce emissions from non-road sources.	2006
Policy ENV-3.1. Local Action Plan. The City will adopt and implement a local action plan to reduce greenhouse gas emissions.	
<ul style="list-style-type: none"> • Work with other City departments to evaluate financing options for municipal energy efficiency. 	2004
<ul style="list-style-type: none"> • Assist with adoption of Municipal Sustainable (building) Design Guidelines. 	2004-2005
<ul style="list-style-type: none"> • Work with the City's Energy Management Team to promote energy conservation and other green building practices through a variety of approaches including workshops, demonstration projects, and incentive-based or mandatory green building programs. 	On-going
Policy ENV-3.2. Biennial Report. The City Manager will prepare a biennial report outlining the City's progress on achieving its greenhouse gas reduction goal and recommending future actions.	
<ul style="list-style-type: none"> • Prepare biennial report on status of greenhouse gas reduction efforts and recommend future actions. 	2005 2007
Policy AQ-13.1 Business Assistance. The City will offer programs and assistance to local businesses interested in reducing their environmental impacts such as the voluntary Climate Wise program.	
<ul style="list-style-type: none"> • Expand the City's Climate Wise Program. (The Climate Wise program encourages greenhouse gas reductions by promoting energy efficiency, pollution prevention, and transportation reduction among Fort Collins businesses on a voluntary basis.) 	On-going
Policy AQ 14-1. Residential Wood Smoke. The City will reduce wood smoke emissions and the number of non-certified wood stoves and fireplaces in the Fort Collins GMA by, for example, insuring compliance with existing regulations, promoting alternatives to wood burning, and helping to resolve neighborhood wood smoke conflicts.	
<ul style="list-style-type: none"> • Encourage "No Burning", educate on clean burning practices, conduct Wood Smoke Response program. 	On-going
<ul style="list-style-type: none"> • Promote zero-interest loans for removal or upgrade of non-certified stoves. 	On-going
<ul style="list-style-type: none"> • Evaluate regulatory action to reduce wood smoke emissions if city-wide wood smoke continues to increase. 	2005 +
Policy AQ-14.2 Ozone Reduction. The City will reduce evaporative emissions associated with residential activities (lawn mowing, fueling, paint selection and storage) by, for example, educating citizens and providing incentives.	
<ul style="list-style-type: none"> • Provide public information on how to reduce evaporative emissions associated with residential activities, such as "Stop at the Click", "Mow When the Sun is Low", etc. 	2004-2007
<ul style="list-style-type: none"> • Continue to offer incentives such as lawn mower rebate, gas can trade-in, and gas cap replacement as long as they remain cost-effective. 	On-going

Policy / Strategy	Suggested Time Frame
Policy AQ-15.1 Health Partnerships. The City will solicit the cooperation and active participation of a diverse range of knowledgeable health professionals and members of the environmental health community to guide the development of policies so that they reflect priority health issues.	
<ul style="list-style-type: none"> Foster relationships with health professionals. 	Start 2004
Policy AQ-15.3 Air Toxics Coordination. The City will work with County, State and Federal health officials to reduce the health risks posed by toxic air pollutants.	
<ul style="list-style-type: none"> Study EPA’s Community Air Toxics Assessment and Risk Reduction Strategies Database for approaches used in other communities (including diesel particulates). Develop and implement solutions if air toxics issues exist. 	Start 2004
Policy AQ-15.4 Indoor Air Quality. Because indoor air pollution can be a serious issue, the City will educate and encourage its residents to reduce their exposure to indoor air pollution.	
<ul style="list-style-type: none"> Promote ZILCH loans (Zero Interest Loan for Conservation Help) for radon mitigation in existing dwellings (if > 4 pCi/l) 	On-going
<ul style="list-style-type: none"> Process Radon Resistant New Construction Ordinance 	2004
<ul style="list-style-type: none"> Explore radon mitigation for multifamily dwellings 	2004 +
<ul style="list-style-type: none"> Develop appropriate indicators for measuring success in reducing exposure to indoor air pollution, including radon. 	2005-2006

In order to understand which strategies affect which pollution sources, the strategies are grouped below according to source they affect. If a strategy affects more than one source category, it is listed under each source it affects.

Mobile Sources - Motor Vehicle Emissions

- Foster integrated solutions to land use, transportation, and air quality problems.
- Participate in regional transportation planning efforts (i.e. the North I-25 Corridor Environmental Impact Statement)
- Promote use of alternative fuels and technology that improve air quality. Consider a regional workshop to evaluate the economics, availability of fuels, and feasibility of increasing alternative fueling infrastructure (i.e. BioDiesel and low sulfur fuel).
- Explore and implement price mechanisms of the free market to reduce VMT and single occupancy vehicle use.
- Work to retain an emissions testing program that cost-effectively identifies and repairs high polluting vehicles.
- Conduct pilot Community Readiness study to identify the community’s readiness to embrace vehicle miles traveled (VMT) reduction efforts, followed by implementation of recommendations.

- Evaluate an Episodic Controls Program to reduce pollution emissions when visibility readings are high. The City would inform the public when high-pollution episodes occur and would offer incentives to reduce driving (reduced bus fares, promotion of telework, etc.)
- Use the results of the peer cities VMT program study to reduce performance gaps in Fort Collins program, if any exist.
- Conduct public education about the impacts of vehicle emissions, importance of car maintenance, benefit of purchasing of low emission fuel-efficient vehicles, and reduced idling.
- Promote air quality education at schools; facilitate teacher training (Clean Air Trunk; Cars, Cures, Cultures curricula)
- Partner with SmartTrips to promote VMT reduction at schools.
- Promote automotive technician training.
- Maintain air quality City Web pages to inform the public.
- Evaluate whether a car-sharing program (where members have access to a fleet of local vehicles, but do not own the vehicles) would benefit Fort Collins' air quality.

Mobile Sources – Non-Road Emissions

- Promote use of alternative fuels and technology that improve air quality. Consider a regional workshop to evaluate the economics, availability of fuels, and feasibility of increasing alternative fueling infrastructure (i.e. BioDiesel and low sulfur fuel).
- Study EPA's Community Air Toxics Assessment and Risk Reduction Strategies Database for approaches used in other communities (including diesel particulates). Develop and implement solutions if air toxics issues exist.
- Conduct incentive-based programs to reduce emissions from non-road sources such as a lawn mower rebate program.
- Evaluate City procurement guidelines for products and services that would reduce emissions from non-road sources.
- Continue to offer incentives such as lawn mower rebate, gas can trade-in, and gas cap replacement as long as they remain cost-effective.
- Provide public information on how to reduce evaporative emissions associated with residential activities, such as "Stop at the Click," Mow When the Sun is Low," etc.
- Maintain air quality City Web pages to inform the public.

Commercial and Industrial Emissions

- Expand the City's Climate Wise Program. Climate Wise helps Fort Collins businesses to voluntarily reduce greenhouse gases through energy efficiency, pollution prevention, and travel reduction.
- Explore enhanced pollution prevention opportunities with community partners such as the Chamber of Commerce.
- Study EPA's Community Air Toxics Assessment and Risk Reduction Strategies Database for approaches used in other communities (including diesel particulates). Develop and implement solutions if air toxics issues exist.
- Maintain air quality City Web pages to inform the public.

Residential Emissions

- Require radon-resistant new construction for single-family and multi-family dwellings.
- Evaluate regulatory action to reduce wood smoke emissions if citywide wood smoke continues to increase.
- Promote zero-interest loans for removal or upgrade of non-certified stoves.
- Promote zero-interest loans for radon mitigation in existing dwellings.
- Continue to offer incentives such as lawn mower rebate, gas can trade-in, and gas cap replacement as long as they remain cost-effective.
- Provide public information on how to reduce evaporative emissions associated with residential activities, such as “Stop at the Click,” Mow When the Sun is Low,” etc.
- Encourage “No Burning,” educate on clean burning practices, conduct Wood Smoke Response program.

City Government Operations

- Promote use of alternative fuels and technology that improve air quality. Consider a regional workshop to evaluate the economics, availability of fuels, and feasibility of increasing alternative fueling infrastructure (i.e. BioDiesel and low sulfur fuel).
- Adopt Municipal Sustainable (building) Design Guidelines.
- Evaluate financing options for municipal energy efficiency, with other City departments.
- Promote energy conservation and other green building practices, with the City’s Energy Management Team, through a variety of approaches including workshops, demonstration projects, and incentive-based or mandatory green building programs.

Data Collection and Reporting Strategies

- Maintain air quality City Web pages to inform the public
- Evaluate the potential for small-area violations of air pollution standards (hotspots).
- Update the Air Quality Plan every five years.
- Prepare biennial Air Quality Indicators Report
- Conduct biennial air quality survey to gather data on citizen views, actions, and emissions.
- Evaluate performance of Fort Collins VMT reduction programs in comparison with peer cities.
- Report trends in air quality data annually.
- Report the status of actions to reduce greenhouse gases biennially, and recommend future actions.
- Develop appropriate indicators for measuring success in reducing exposure to indoor air pollution, including radon.

4.3 Efforts to Reduce Air Pollution from Municipal Operations

In accordance with Policy AQ-16.1 stating that the City should lead by example in efforts to reduce air pollution, there are a number of City goals and activities that reduce air pollution from municipal activities. A few of these are highlighted below.

- Continue periodic pollution prevention audits of City facilities; implement cost-effective recommendations.
- Purchase one turbine of wind energy for City facilities.
- Promote use of alternative-fueled original equipment vehicles, and high fuel efficiency vehicles in City fleet.
- Strive to achieve the goal of 75% of light duty City fleet vehicles meeting Ultra-Low Emission Vehicle standards by 2008.
- Strive to achieve 15% reduction in City building energy use (per square foot) by building energy efficient buildings and installing energy efficient retrofits in existing buildings.
- Continue best practices in street sanding and sweeping techniques to reduce airborne emissions.
- Continue City programs to encourage employees to reduce their own driving.

4.4 Other City Programs that Benefit Air Quality

There are numerous other City programs and activities that support air quality improvement. Some of these other major program areas are discussed below.

Electric Energy Supply Policy

Fort Collins' City Council adopted a new Electric Energy Supply Policy in March 2003. One of the primary objectives of the policy is to reduce the environmental impact of electricity generation through conservation, energy efficiency, load management and the increased use of renewable energy. The policy includes the following specific targets for energy conservation and renewable energy:

- Reduce per capita electric consumption 10% from the baseline of 2002, by the year 2012. The 10% per capita consumption reduction target will reduce overall electric consumption approximately 16% by 2012.
- Work with Platte River Power Authority to increase the City's percentage of renewable energy to 2% by the end of 2004 and to 15% by the year 2017.

These two strategies will significantly reduce greenhouse gas emission and will reduce power plant emissions associated with electricity generation, as well.

City SmartTrips Program

The City of Fort Collins has its own transportation demand management program, called SmartTrips. This program, identical in name to the TDM program of the North Front Range MPO, provides programs and services to make it easier for commuters to use other modes of travel rather than driving alone. The SmartTrips program goal is

“to ease congestion on Fort Collins streets and improve air quality”.

This is accomplished through individual programs that focus on reducing VMT and increasing mode share of trips made by alternatives to the single occupant vehicle. The SmartTrips program conducts business and community outreach, transit promotion, bicycle and pedestrian outreach, and youth outreach.

Advanced Traffic Management System

During the past three years, the City installed an Advanced Traffic Management System, built a new Traffic Management Center to house the system and department, and upgraded nearly 16 miles of arterial roadway and the associated traffic signals to a fiber optic communication network. The total cost of designing, acquiring and installing/constructing the system was estimated to be just under 6 million dollars. The City provided nearly 5 million dollars and received a Federal Highways Administration Intelligent Transportation System (ITS) grant for \$994,205. The City also partnered with CDOT to install 10 video monitoring cameras on 4 of the City arterials. The video images are monitored on an 8 screen video display system funded by the Congestion Mitigation and Air Quality (CMAQ) program. The video capabilities allows traffic staff to monitor traffic activity on the City arterials.

Following equipment upgrades, signal timings of each street are revised and fine tuned. Signal timing work was completed on College and Harmony in early 2003. As a result, accident numbers between 2002 and 2003 have decreased 9%. Recent studies also indicate that there is less motorist delay, fewer stops at red lights, and a reduction in vehicle emissions due to improved signal coordination. The City expects the same positive results as other streets are installed on the new system and are fine tuned.

Building Energy Codes

During 2004, City Council will consider changes to the City's residential building code. The proposal involves incorporation of the 2003 "International Residential Code" (IRC) into the City's code. The 2003 IRC code provisions are already in effect in many parts of the county. New energy conservation construction standards outlined in the code will provide increased energy conservation and performance in new homes. Energy savings will accrue from increased standards for wall insulation, window performance, and duct sealing. According to modeling performed by E-Star Colorado, an average new home will save 100 therms of natural gas, and 270 kWh of electricity each year. In addition to reduced homeowner energy costs, these energy savings translate into reductions of sulfur dioxide, nitrogen dioxide, and greenhouse gas emissions.

Hydrogen

As the region and the nation moves through a period of uncertainty regarding energy and climate, a unique opportunity exists in Fort Collins to provide leadership in the development of hydrogen fuel. The promise of hydrogen is that of a safe, zero-emission fuel derived from domestic renewable energy sources. Hydrogen is not a source of energy, but it is an energy carrier. Coupled with significant growth of renewable energy resources, it can play an important role as part of the solution to a clean sustainable energy supply.

Recognizing this potential, in early 2001, the City Manager convened a Hydrogen Task Force with representatives from relevant City advisory boards and staff departments to evaluate the City's potential role in promoting the use of hydrogen energy. The Task Force submitted a report with recommendations in August 2001. As a result of recommendations, City Council passed a resolution in March 2002 establishing a policy to implement hydrogen-related projects within the city. Since that time, staff has been working at establishing partnerships and has been researching grant opportunities for the purpose of implementing projects. Currently, a fueling station is being built that uses a mixture of hydrogen and natural gas (Hythane®) to fuel “original equipment” natural gas vehicles. The hydrogen will be produced with an electrolyzer at the fueling site. A mini-bus, built to operate on compressed natural gas will be the first City vehicle to operate on Hythane.

5.0 MEASUREMENT AND REPORTING

5.0 MEASUREMENT AND REPORTING

To measure progress in protecting air quality, we use indicators. One indicator can reflect trends in multiple pollutants. Indicators can provide an assessment of the current situation and, in some cases, provide a measurement of parts of the problem that are within our control.

This section identifies air quality indicators that will be used to assess air quality status, evaluate progress, and guide the direction of future actions when the Air Quality Plan is next updated. Additional indicators may be added to this list if appropriate, such as indicators of mobility, radon risk, air toxics risk, and City investment in alternative modes.

5.1 Air Quality Indicators

Table 5.1 Air Quality Indicators

Indicator	Unit	Desired Direction
Compliance with National Ambient Air Quality Standards	Ozone – PPB Carbon Monoxide – PPM Particulates – ug/m ³	No violations
Ambient Air Pollution Levels	Trend over time	Declining concentrations
Visibility Standard	# of days out of compliance	Improving compliance
VMT growth rate	Annual growth rate (%)	Decreasing
VMT reduction program performance	NA	Meet or exceed performance of comparable cities VMT reduction program
Fleet average tailpipe emissions	Grams per mile as estimated by EPA's Mobile Model	Reductions over previous years
City-wide Total Motor Vehicle Emissions	Tons per Day of VOC, NO _x , PM _{2.5}	Reductions over previous years
Commercial and Industrial Emissions	Tons Per Year	Reductions over previous years
Greenhouse Gas Emissions	Citywide emissions of CO ₂ e (tons per year)	Reductions over previous years
Wood smoke emissions	City-wide emissions (tons per year)	Reductions over previous years
Non-certified wood stoves	Number of non-certified units in the City, based on local survey data	Decrease in number of non-certified wood stoves

5.2 Air Quality Reporting

5.2.1 Annual Ambient Air Quality Report

On an annual basis, City staff will produce a brief report showing the status of ambient air quality measurements from Fort Collins monitors, including ozone, carbon monoxide, PM₁₀, PM_{2.5}, and visibility. This report will be sent to City Council and posted on the City's Web site. The City will also prepare a brief annual summary of activities undertaken to protect air quality and submit this to City Council.

5.2.2 Program Evaluation and Reporting

The Air Quality Plan will be updated every five years, in conjunction with updates of City Plan and the Transportation Master Plan. The status of air quality indicators will be evaluated and reported to Council at least twice prior to the next update of the Air Quality Plan. The indicator report prepared just prior to the next update of the Air Quality Plan will be used to determine whether modifications to policies and implementation strategies are warranted in the next update of the Air Quality Plan.

GLOSSARY

GLOSSARY

AIRS - EPA's "Aerometric Information Retrieval System", a national database of air quality data.

Acid deposition – The term acid deposition is used to describe all possible forms of acid pollution that can be found in rain, sleet, snow, fog, cloud vapor, particles, and gasses. More commonly it is due to secondary pollutants that form from the oxidation of nitrogen oxides (NO_x) or sulfur dioxide (SO₂) gases that are released into the atmosphere from the combustion of fossil fuel. The process of altering these gases into their acid counterparts can take several days, and during this time these pollutants can be transferred hundreds of miles from their original source. Acid deposition can have a variety of impacts to the ecosystem, including damage to crops, forests, and aquatic ecosystems. In addition, acid rain accelerates the decay of building materials and paints, including irreplaceable buildings, statues, and sculptures that are part of our nation's cultural heritage.

CAA – Clean Air Act. The original Clean Air Act was passed in 1963, but our national air pollution control program is actually based on the 1970 version of the law. The 1990 Clean Air Act Amendments are the most far-reaching revisions of the 1970 law.

CDOT – Colorado Department of Transportation

CDPHE – Colorado Department of Public Health and Environment

city - The term city (lower case c) refers to the whole area of the city and its inhabitants.

City – When the term City (capital C) is used, it refers to the City of Fort Collins as a municipal government.

City Plan – Fort Collins Comprehensive Land Use Plan. First adopted under the "City Plan" title in 1997, and updated in 2004.

CO – Carbon monoxide, one of the six criteria pollutants for which National Ambient Air Quality Standards have been set by EPA.

Criteria pollutants – Six pollutants that EPA has defined health and welfare standards for; carbon monoxide, ozone, particulates, sulfur dioxide, nitrogen dioxide, and lead.

Early Action Compact - The U.S. Environmental Protection Agency is working with communities to get clean air as soon as possible by entering into Early Action Compacts that will reduce ground-level ozone, commonly known as smog. Communities close to or exceeding the 8-hour ozone standard that have elected to enter into an Early Action Compact will start reducing air pollution at least two years sooner than required by the Clean Air Act. Communities participating in the Early Action Compacts must submit plans for meeting the national 8-hour ozone air quality standard in 2004, rather than waiting until 2007 -- the deadline for other areas

not meeting the 8-hour ozone standard. The Denver-Boulder-Greeley-Fort Collins area has entered into an Early Action Compact for ozone.

EIS (Environmental Impact Statement) – The National Environmental Policy Act (NEPA) requires every federal agency to prepare an EIS detailing the environmental impact of, and alternatives to, every proposal for a major federal action significantly affecting the quality of the human environment.

EnLibra - EnLibra is the name of a set of principles for protecting air, land and water. The principles have proven effective in resolving environmental and natural resource disputes in a more inclusive manner. The word EnLibra was coined by the Western Governors to symbolize balance and stewardship.

Exceedance (of a standard) – when the air quality measurement goes above the level of a standard. Because compliance with many standards is calculated statistically, one exceedance does not necessarily result in a violation of a standard.

Fine particles - Particulate matter refers to tiny particles of solid or semi-solid material suspended in the atmosphere. “Fine” particles are PM_{2.5} (particulate matter of 2.5 microns or less) which is approximately 1/20 the diameter of a human hair.

Growth Management Area Boundary- An area identified through public policy, within which urban development will be allowed.

Greenhouse gases - Atmospheric greenhouse gases (water vapor, carbon dioxide, and other gases) are those gases that trap some outgoing infrared energy emitted from the Earth and cause heat to be retained in the atmosphere, somewhat like the glass panels of a greenhouse. Without this natural "greenhouse effect," temperatures would be much lower than they are now, and life as known today would not be possible. However, the recent increase in the concentration of atmospheric greenhouse gases is linked to the phenomenon known as global warming.

HAPS (Hazardous Air Pollutants) - The US Congress amended the federal Clean Air Act in 1990 to address a large number of pollutants that are known to cause or may reasonably be anticipated to cause adverse effect to human health or adverse environmental effects. 188 specific pollutants and chemical groups were initially identified as HAPS, and the list has been modified over time.

ICLEI (International Council for Local Environmental Initiatives) - a democratic, non-profit association of local governments, serves as an advocate for local government before national and international bodies in order to increase understanding and support for local environmental protection and sustainable development activities.

Industrial HAPS - The 1990 CAAA address a large number of air pollutants that are known to cause or may reasonably be anticipated to cause adverse effects to human health or adverse environmental effects. 188 specific pollutants and chemical groups were initially identified as hazardous air pollutants (HAPs), and the list has been modified over time. This category of

pollutants in the Air Quality Plan refers to only industrial source HAPS; those emitted from small and large commercial and industrial sources.

Lead – Lead is a metal that can harm the nervous system. The current sources of atmospheric lead emissions are lead gasoline additives, nonferrous smelters, and battery plants. Between 1970 and 1997, air emissions of lead in the United States were reduced by 98%, largely as a result of the phase-out of leaded gasoline.

LUTRAQ – An environmental planning approach that integrates land use, transportation, and air quality planning and decision-making. The City of Fort Collins formed an internal LUTRAQ team when City Plan was first developed in the mid 1990's.

Mobile Source HAPS - The 1990 CAAA address a large number of air pollutants that are known to cause or may reasonably be anticipated to cause adverse effects to human health or adverse environmental effects. 188 specific pollutants and chemical groups were initially identified as hazardous air pollutants (HAPs), and the list has been modified over time. According to Denver study, the most important mobile source air toxics are formaldehyde, acetaldehyde, 1,3 butadiene, benzene, acrolein, and diesel exhaust particulate matter plus diesel exhaust organic gases.

MPO (Metropolitan Planning Organization) – The regional organization responsible for comprehensive transportation planning and programming in urbanized areas. Work products include the Transportation Plan, the Transportation Improvement Program, and the Unified Planning Work Plan. There are six MPO's in Colorado. Fort Collins' MPO is called the *North Front Range Transportation and Air Quality Planning Council*. It consists of 13 local governments including Larimer and Weld Counties, Fort Collins, Greeley, and Loveland. This MPO is also the lead air quality planning agency for the region for developing State Implementation Plans.

NAAQS (National Ambient Air Quality Standards) –The Clean Air Act, which was last amended in 1990, requires EPA to set National Ambient Air Quality Standards for pollutants considered harmful to public health and the environment. The Clean Air Act established two types of national air quality standards. **Primary standards** set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. **Secondary standards** set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.

NOx (Nitrogen Oxides) - NOx is the generic term for a group of highly reactive gases, all of which contain nitrogen and oxygen in varying amounts. Many of the nitrogen oxides are colorless and odorless. NOx includes NO₂ (nitrogen dioxide), NO (nitric oxide), N₂O (nitrous oxide), and NO₃- (nitrates). Nitrogen oxides form when fuel is burned at high temperatures, as in a combustion process. The primary sources of NOx are motor vehicles, electric utilities, and other industrial, commercial, and residential sources that burn fuels.

NFRAQS - The Northern Front Range Air Quality Study was instituted by the Colorado State Legislature through House Bill 95-1345. The legislation delineated an independent, objective, scientifically peer-reviewed study of air pollution along the Northern Front Range of Colorado to determine a) sources of carbon particles found in Denver's "Brown Cloud", b) whether the Denver area is ammonia-rich with regard to formation of ammonium nitrate and ammonium sulfate particles, and c) what are the sources of visibility-reducing PM_{2.5} particles. PM_{2.5} sampling was conducted in Fort Collins during winter '96/'97 high pollution episodes. The majority of sampled particles originated from motor vehicles.

NRD (Natural Resources Department) – The City of Fort Collins Natural Resources Department.

Ozone - Ozone is a secondary pollutant formed when nitrogen oxides and hydrocarbons react in the presence of sunlight. Elevated ozone levels can cause breathing problems and respiratory infections for the elderly, young and those with pre-existing ailments. Even healthy people who exercise or work outdoors can experience breathing problems when exposed to elevated ozone levels. While ground level ozone in high concentrations is considered an air pollutant, stratospheric ozone in the upper atmosphere (12 - 30 miles above the ground) is good because it absorbs cancer-causing ultraviolet radiation.

PM₁₀ - Particulate matter refers to tiny particles of solid or semi-solid material suspended in the atmosphere. PM₁₀ are particles that are 10 microns or less in diameter (~ 1/6 of a human hair). PM₁₀ is generally created during the combustion of fossil fuels in industrial processes or heating and consists of fly ash from power plants, carbon black from diesel and gasoline engines, and soot from woodburning.

PPM – parts per million

Policy – As defined by *City Plan*, a definite course or method of action selected to guide and determine present and future decisions.

Principle – As defined by *City Plan*, a general or fundamental rule, doctrine, or assumption.

State Implementation Plan - A document that contains procedures detailing how a state will attain or maintain compliance with National Ambient Air Quality Standards. It is prepared by the state and submitted to the Environmental Protection Agency for approval.

Sulfur Dioxide – Sulfur dioxide (SO₂) is a colorless gas with a pungent odor belonging to the family of gases called sulfur oxides (SO_x). These gases are formed when fuel containing sulfur (mainly coal and oil) is burned, and during metal smelting and other industrial processes. SO₂ is highly soluble in water and is readily oxidized in the air to sulfates, contributing to acid rain associated with acidification of lakes and streams, accelerated corrosion of buildings and monuments, reduced visibility, and adverse health effects.

Sustainability – refers to the long-term social, economic and environmental health of a community. A sustainable community thrives without compromising the ability of future generations to meet their needs. Sustainable cities use resources efficiently and effectively. They conserve, reuse, and recycle. They use local resources when they can. They minimize exportation of environmental risk.

TDM (Transportation Demand Management) - TDM is a general term for actions that encourage a decrease in the demand for our existing transportation systems. Example strategies include ridesharing and transit use, zoning and ordinances that promote transit use and mixed-use development, public education about transportation issues, park-and-ride facilities, various driving disincentives and ridesharing incentives, and commute trip reduction programs.

TRI (Toxics Release Inventory) – The Toxics Release Inventory (TRI) is a publicly available EPA database that contains information on toxic chemical releases and other waste management activities reported annually by certain covered industry groups as well as federal facilities. This inventory was established under the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) and expanded by the Pollution Prevention Act of 1990.

Visibility - "Visibility" is a measure of how the air looks. It can be described as the maximum distance that an object can be perceived against a background sky. Visibility also can refer to the clarity of objects in the distance, middle or foreground. Visibility is unique among air pollution effects because it involves human perception and judgment.

VMT (Vehicle Miles Traveled) - A measure of the extent of motor vehicle operation; the total number of vehicle miles traveled within a specific geographic area over a given period of time.

VOC (Volatile Organic Compound) - Any organic compound that participates in atmospheric photochemical reactions except those designated by EPA as having negligible photochemical reactivity.

Violation (of a standard) – occurs when the conditions defining compliance with a standard are exceeded. This often involves averaging measurements over time. For example, a violation of the 8-hour ozone standard occurs when the three year average of the 4th highest daily value each year exceeds 0.085 PPM.

APPENDIX A

Fort Collins Air Quality Status

A.1 AMBIENT AIR QUALITY

This appendix provides comprehensive information about the status of local air quality. Air quality can be evaluated in several different ways. Often, air pollution levels in the outside air (ambient concentrations) are measured and reported. Ambient air measurements are a function of the amount of pollution emitted, the chemistry of the pollutants, the weather, and the location of the monitoring site.

In the absence of ambient air quality data, emissions inventories are sometimes used to make an estimate of how much pollution is emitted into the air. These estimates are based on many factors, including actual monitored readings from emissions stacks, levels of industrial activity, fuel consumption, vehicles miles traveled, and other activities that cause pollution.

When measuring progress in protecting air quality, indicators are often used. Indicators are a useful measure because they typically focus on parts of the problem that are within our control. One indicator can reflect trends in multiple pollutants.

A.1.1 Criteria Pollutants

The U.S. EPA has established National Ambient Air Quality Standards (NAAQS) for six pollutants, known as “criteria” pollutants. They are carbon monoxide, ozone, nitrogen dioxide, sulfur dioxide, particulate matter, and lead. Primary standards are designed to protect human health and secondary standards to protect human welfare. The NAAQS are listed in Table A-1 on the next page.

A.1.2 Local Monitoring Network

In Fort Collins, compliance monitoring is conducted for four of the criteria pollutants; carbon monoxide, ozone, PM₁₀ and PM_{2.5}. In addition, monitoring for compliance with the Colorado visibility standard is also conducted. The monitoring sites are operated and maintained by the Colorado Department Public Health and Environment (CDPHE) and the Larimer County Health Department.

Monitoring for carbon monoxide, ozone, and meteorology conditions occurs on CSU’s campus, at the intersection of Laurel and Mason Streets. Monitoring for PM₁₀ and PM_{2.5} is conducted on the roof of the CSU Facilities Building. These sites are intended to represent “neighborhood” scale exposure. A second carbon monoxide monitoring site was installed on South College avenue, adjacent to Target, in November 2002. This site is intended to represent worst case (micro-scale) conditions.

Visibility monitoring records optical properties of the atmosphere between the monitoring sites located at Holiday Inn on Prospect and the DMA Tower at Olive and Remington. Figure A-1 shows the locations of monitoring sites in Fort Collins.

Table A.1 National Ambient Air Quality Standards

Pollutant	Primary Stds.	Averaging Times	Secondary Stds.
Carbon Monoxide	9 ppm (10 mg/m ³)	8-hour ¹	None
	35 ppm (40 mg/m ³)	1-hour ¹	None
Lead	1.5 µg/m ³	Quarterly Average	Same as Primary
Nitrogen Dioxide	0.053 ppm (100 µg/m ³)	Annual (Arithmetic Mean)	Same as Primary
Particulate Matter (PM ₁₀)	50 µg/m ³	Annual ² (Arith. Mean)	Same as Primary
	150 µg/m ³	24-hour ¹	
Particulate Matter (PM _{2.5})	15 µg/m ³	Annual ³ (Arith. Mean)	Same as Primary
	65 µg/m ³	24-hour ⁴	
Ozone	0.08 ppm	8-hour ⁵	Same as Primary
	0.12 ppm	1-hour ⁶	Same as Primary
Sulfur Oxides	0.03 ppm	Annual (Arith. Mean)	-----
	0.14 ppm	24-hour ¹	-----
	-----	3-hour ¹	0.5 ppm (1300 µg/m ³)

¹ Not to be exceeded more than once per year.

² To attain this standard, the expected annual arithmetic mean PM₁₀ concentration at each monitor within an area must not exceed 50 µg/m³.

³ To attain this standard, the 3-year average of the annual arithmetic mean PM_{2.5} concentrations from single or multiple community-oriented monitors must not exceed 15 µg/m³.

⁴ To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 65 µg/m³.

⁵ To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.085 ppm.

⁶ (a) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is ≤ 1, as determined by appendix H. (b) The 1-hour standard is applicable to all areas notwithstanding the promulgation of 8-hour ozone standards under Sec. 50.10. On June 2, 2003, (68 FR 32802) EPA proposed several options for when the 1-hour standard would no longer apply to an area.

Figure A.1 Location of state-run monitoring sites in Fort Collins

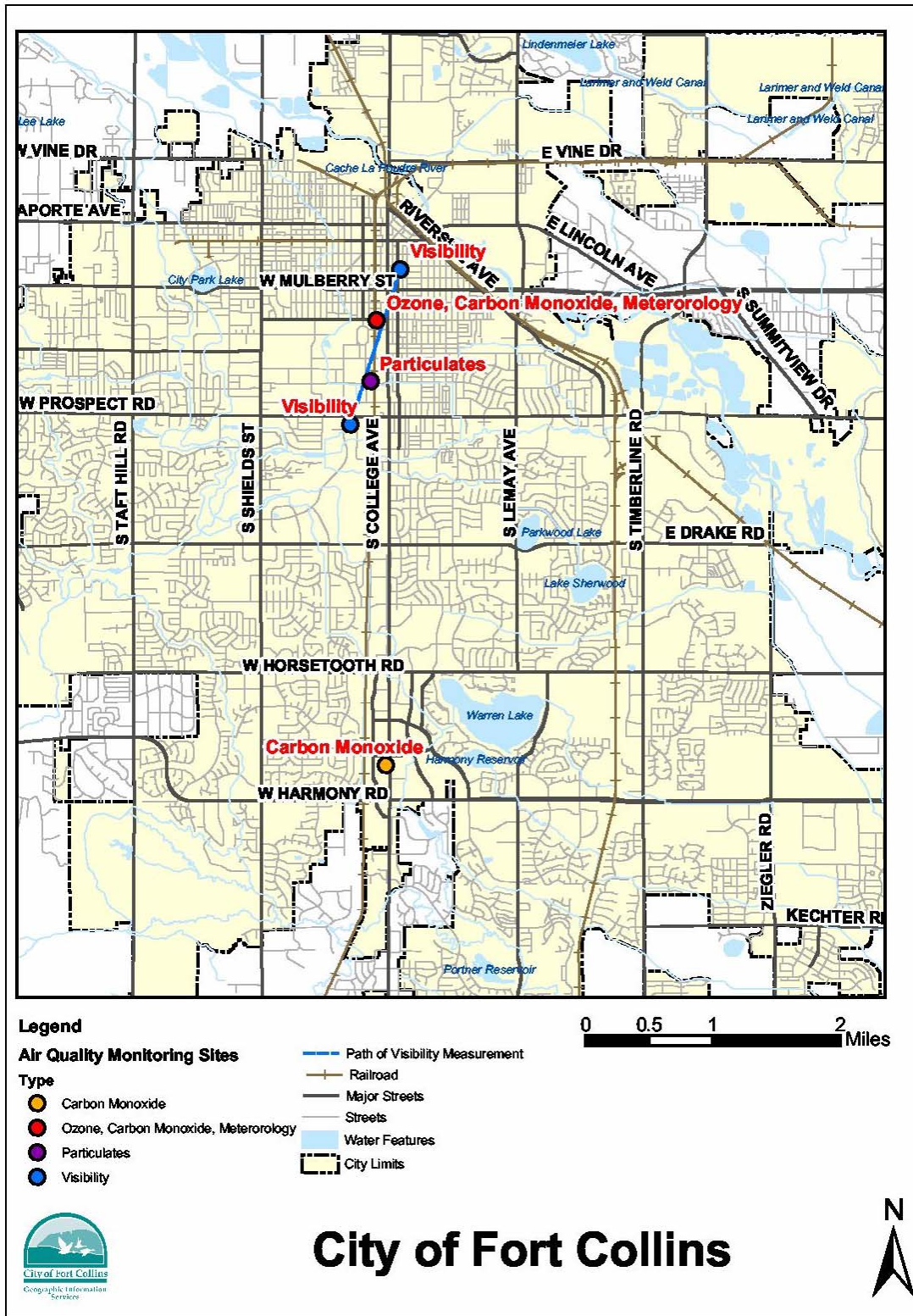


Figure A.2 Fort Collins CO, O₃ and Meteorology Monitoring Site; Laurel & Mason



Figure A.3 Fort Collins CO Monitoring Site, South College at Target



A.1.3 Carbon Monoxide

Carbon monoxide (CO) is a tasteless, odorless, colorless, poisonous gas produced by incomplete combustion. Carbon monoxide affects the central nervous system by depriving the body of oxygen, especially persons with cardiac or respiratory problems, the elderly and pregnant women.

The primary source of CO is incomplete combustion of fossil fuels used for transportation and heating. In Fort Collins, approximately 85% of the CO comes from

motor vehicles and 10% comes from woodburning. Other sources include refuse and agricultural burning, natural forest fires, and by-products from some industrial sources. CO tends to build up when shallow cold air masses are trapped close to the ground by warmer air masses above and by the mountains to the west. These temperature inversions occur most commonly during fall and winter months.

The primary National Ambient Air Quality Standard (NAAQS) for CO is 9 ppm (parts per million) averaged over an eight hour period and 35 ppm averaged over a one hour period. There are no secondary CO standards. The EPA allows no more than one exceedance of the standard per year for any given location. Subsequent exceedances constitute violations of the NAAQS. Exceedances of the 8-hour standard are the target of control efforts, as 1-hour values are highly dependent upon meteorological variations.

Throughout the 1980's, Fort Collins violated the carbon monoxide standard numerous times. The City was designated a "non-attainment area" by the U.S. EPA, and a State Implementation Plan was developed to help bring carbon monoxide levels down.

Federal new car emissions standards played a major role in reducing carbon monoxide levels, assisted by the emissions testing program. The carbon monoxide standard was last violated in 1991, as illustrated in Figure A4. In 2002, the EPA approved a Carbon Monoxide Maintenance Plan for Fort Collins. Through air quality modeling, the Maintenance Plan finds that the city is not expected to violate the carbon monoxide standard for at least the next 15 years.

Figure A.4 Carbon Monoxide Levels in Fort Collins, Laurel & Mason

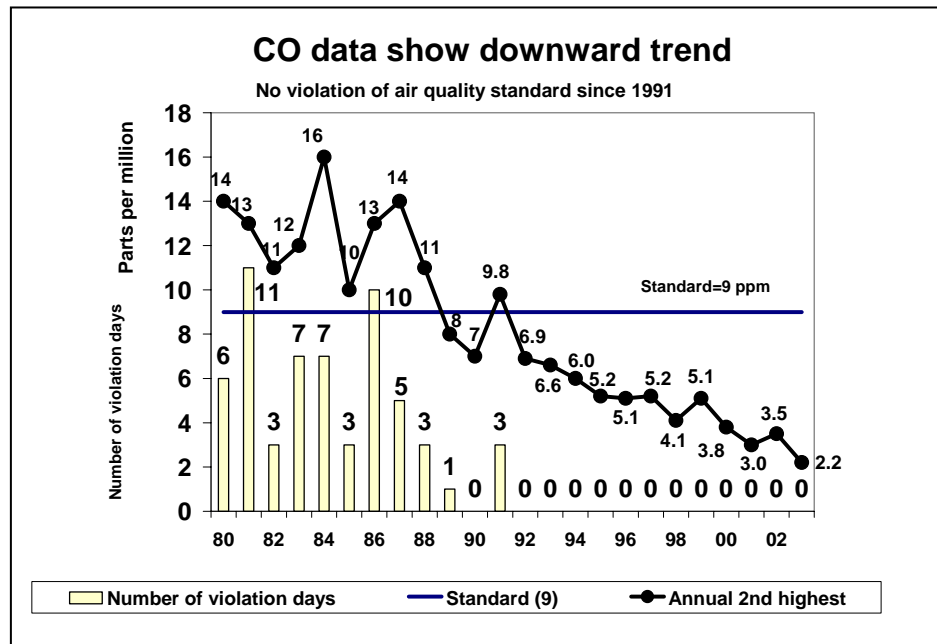


Figure A.5 Carbon Monoxide Levels; North vs. South Site

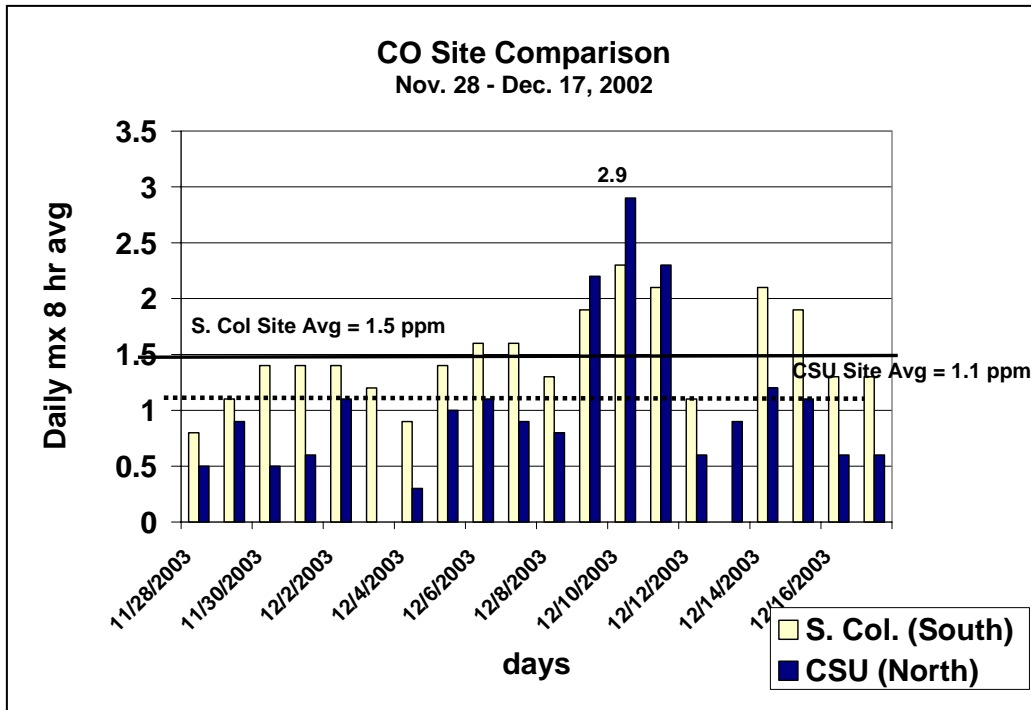
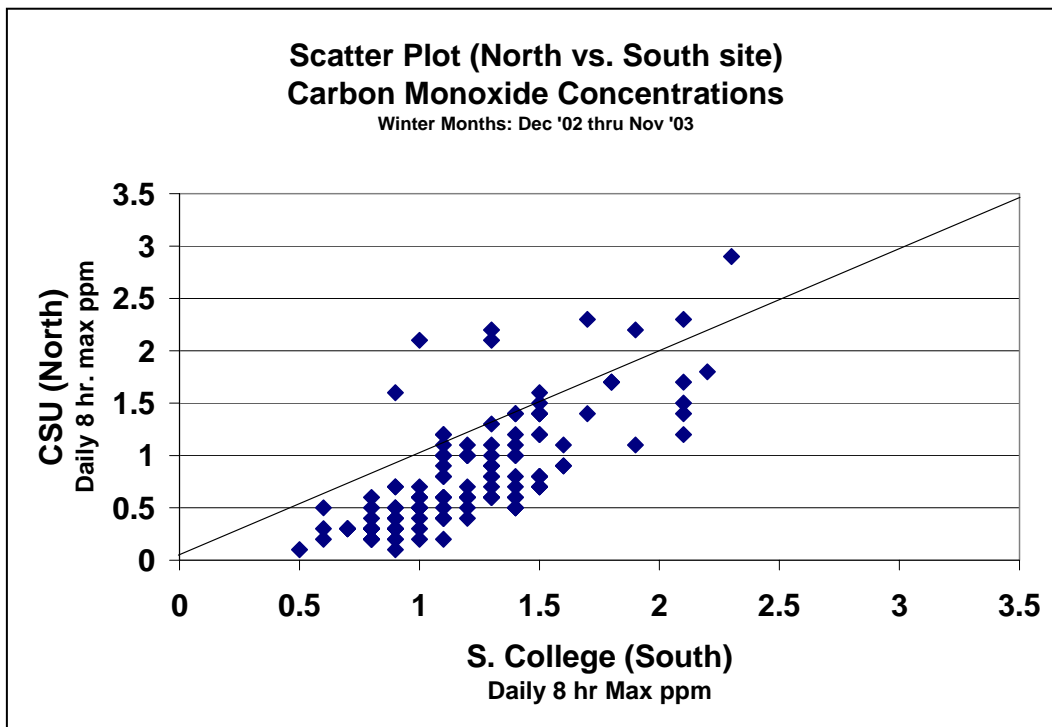


Figure A.6 Comparison of North and South Carbon Monoxide Levels



Figures A.4 and A.5 show that the long-term “neighborhood scale” monitoring site at Laurel and Mason continues to represent the maximum concentrations, despite not being the highest traffic volume intersection. This finding was also corroborated in 1987/1988, when a second CO monitor was placed at the intersection of College and Drake, then the highest traffic intersection. Data from that study, funded by CDPHE, also showed that the Mason and Laurel location had the higher values during the critical CO period (between 4 p.m. and midnight).

A.1.4 Ozone (O₃)

Ozone (O₃) is a highly reactive form of oxygen. At normal concentrations, ozone is colorless and odorless. At high concentrations, it is an unstable bluish gas with a pungent odor. Ground level ozone at high concentrations is considered an air pollutant, and is a major component of photochemical smog. Ground level ozone should not be confused with stratospheric ozone in the upper atmosphere (12 - 30 miles above the ground), which is positive and critical for absorbing cancer-causing ultraviolet radiation.

Ozone is a secondary pollutant formed when nitrogen oxides and hydrocarbons react in the presence of sunlight. Hydrocarbons come from automobile exhaust (and also some vegetation) and nitrogen oxides come from high temperature fuel combustion.

The reactivity of ozone causes health problems because it damages lung tissue, reduces lung function, and increases the sensitivity of the lungs to other irritants. Ozone can also act as an irritant to the mucous membranes of the eyes and throat and can reduce immune system capacity. Scientific evidence suggests that ozone affects not only individuals with respiratory problems, but also affects healthy adults and children. In high concentrations, ozone causes damage to plants and deteriorates materials such as rubber and nylon.

In July 1997, EPA promulgated a new standard for ozone. EPA has replaced the previous 1-hour primary ozone standard with a new 8-hour standard to protect against longer exposure periods. The new, more stringent 8-hour ozone standard is 0.80 ppm. Compliance with the standard is determined if the three-year average of the fourth highest annual value does not exceed 0.085.

Fort Collins is approaching violation of the new eight-hour ozone standard, as illustrated in Figure A.7. As of 2003, Fort Collins is at 82 percent of the eight-hour standard. Other locations in the North Front Range, particularly Greeley and Rocky Mountain National Park are even closer to violating the standard, as shown in Figure A.8.

Ozone has become the pollutant of top concern along the Front Range in the past few years. More discussion of the ozone issue can be found in the Issues and Trends section of this appendix.

Figure A.7 Fort Collins Eight Hour Ozone Levels

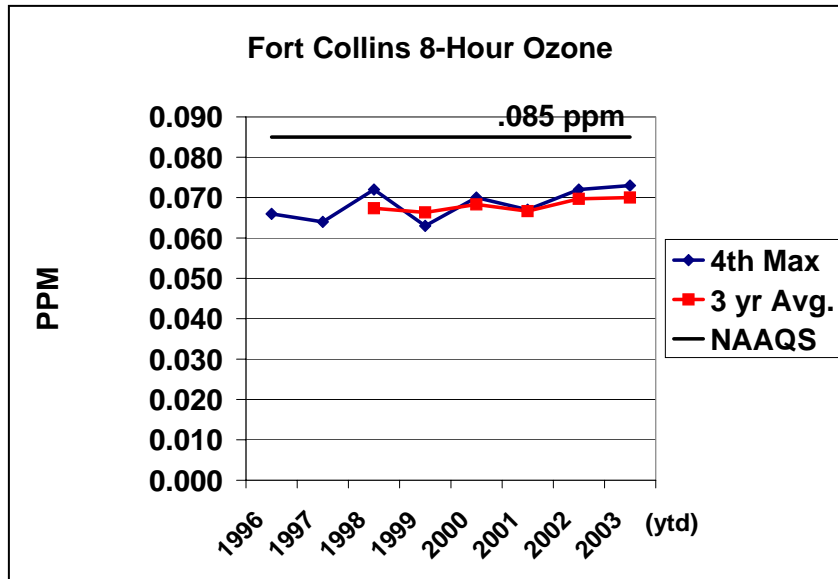
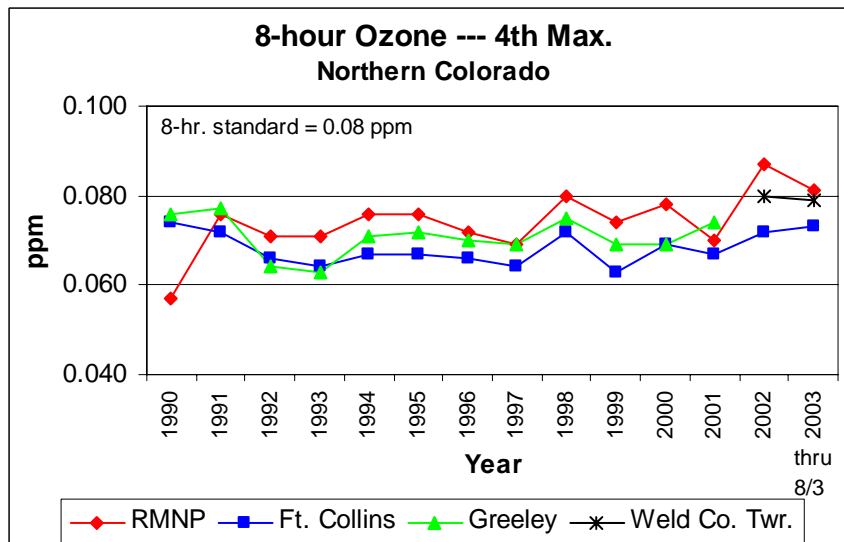


Figure A.8 Northern Colorado Eight Hour Ozone Levels



A.1.5 PM₁₀

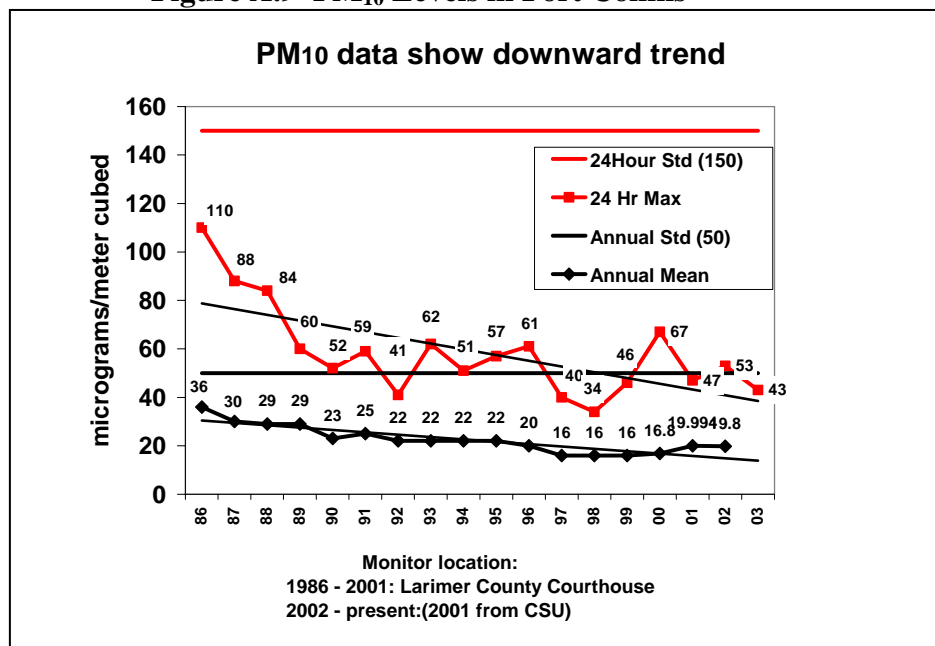
Particulate matter refers to tiny particles of solid or semi-solid material suspended in the atmosphere. This includes particles between 0.1 micron and 50 microns in diameter. Particles larger than 50 microns tend to settle out quickly due to gravity.

Particulates with diameters less than 10 microns or less (PM₁₀) are considered inhalable and are associated with respiratory health impairment. Other impacts of particulates include visibility degradation, vegetation damage and climate change.

Elevated particulate levels can occur in urban and rural areas, mountain valleys, and high wind areas. Sources include roadways, fields, construction, automobile exhaust and wood burning.

PM₁₀ has been monitored in Fort Collins since 1986, where levels have decreased steadily and remain well below the standards of 150 ug/m³ 24 hour average and 50 ug/m³ annual. However, concentrations could rise with increased traffic.

Figure A.9 PM₁₀ Levels in Fort Collins



A.1.6 Fine Particles (PM_{2.5})

PM_{2.5} refers to particulate matter that is 2.5 microns or less (approximately 1/20 the diameter of a human hair), also called "fine" particles. Fine particles are typically secondary aerosols that form when chemical reactions occur between sulfate (from power plants) or nitrate (from industry and motor vehicles) and ammonia (from feedlots) and carbon.

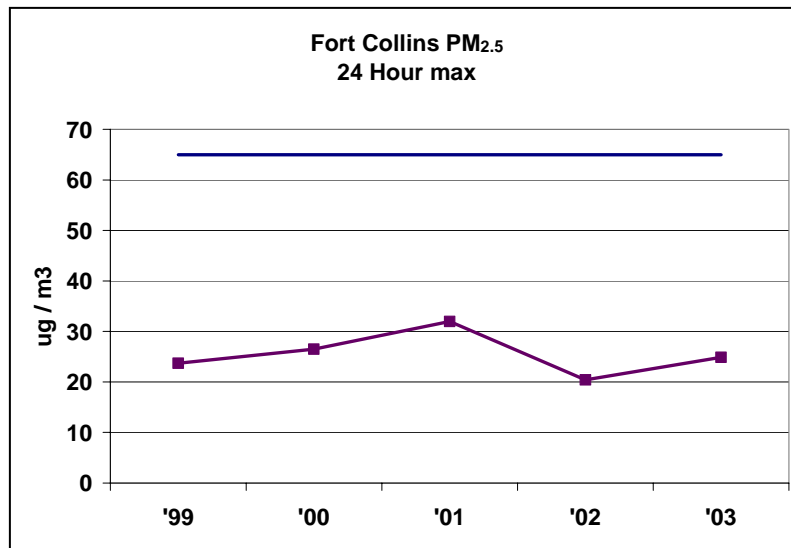
The health risk from particulates is a function of the size and concentration of the dose inhaled. PM_{2.5} can be respired deeply into the alveoli of the lungs, where they remain for a long time and can cause the greatest amount of damage. Particulate matter can reduce lung functioning and can cause or aggravate respiratory conditions, and increase the long term risk of lung cancer or other lung disease such as emphysema, bronchiectasis, pulmonary fibrosis, and cystic lungs.

Fine particles also cause visibility impairment, thus affecting human welfare. $PM_{2.5}$ have the greatest impact on visibility reduction because of their ability to scatter light. Much of Denver's infamous "brown cloud" is caused by fine particles.

In July 1997, EPA established two primary $PM_{2.5}$ standards set at $15 \mu\text{g}/\text{m}^3$ (annual arithmetic mean) and $65 \mu\text{g}/\text{m}^3$ (24-hour average), to provide increased protection against the PM-related health effects found in the community studies. EPA's scientific review concluded that fine particles are a better surrogate for those components of PM most likely linked to mortality and morbidity effects at levels below the previous standards, while high concentrations of coarse fraction particles are linked to effects such as aggravation of asthma.

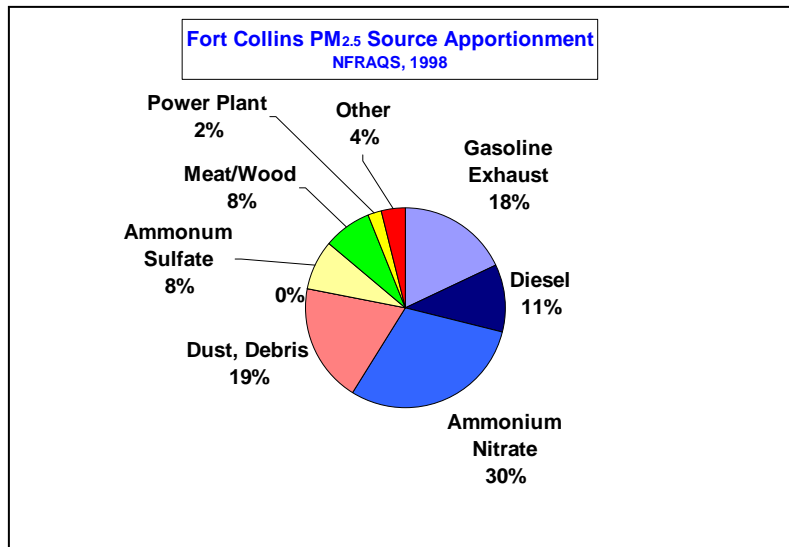
$PM_{2.5}$ monitoring, which began in Fort Collins in the spring of 1999, shows that levels are well below the 24 hour and annual standard.

Figure A.10 Fort Collins $PM_{2.5}$ Levels



The North Front Range Air Quality Study sampled fine particles ($PM_{2.5}$) on select winter high pollution days in 1996/1997 in Fort Collins. A source apportionment study found that ammonium nitrate (a secondary aerosol) is the largest contributor to fine particles. The study attributes the ammonium nitrate to nitrogen oxides produced primarily by mobile sources. The second largest source of fine particles comes directly from mobile source exhaust, which accounts for 29% of $PM_{2.5}$, as shown in Figure A.11.

Figure A.11 Fort Collins NFRAQS Data



A.2 OTHER AIR QUALITY ISSUES

A.2.1 Greenhouse Gases

Human activities have altered the chemical composition of the atmosphere through the buildup of greenhouse gases – primarily carbon dioxide, methane, and nitrous oxide. The heat-trapping property of these gases is undisputed although some uncertainties exist about exactly how earth's climate responds to them. According to the National Academy of Sciences, the Earth's surface temperature has risen by about 1 degree Fahrenheit in the past century, with accelerated warming during the past two decades. There is new and stronger evidence that most of the warming over the last 50 years is attributable to human activities.

The Intergovernmental Panel on Climate Change (IPCC), a group of over 2,500 of the world's climate scientists, is predicting that these impacts may include:

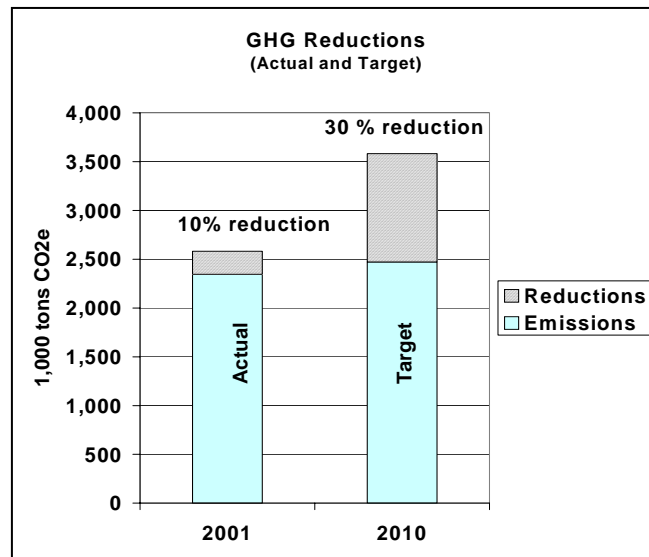
- elevated global average temperatures with a resulting disruption of natural systems
- changes in precipitation rates in many regions impacting on water supply and food production
- increase in the incidence and intensity of extreme weather events, such as floods, blizzards, tornadoes, and droughts
- rise in sea level impacting on coastal areas and low-lying regions

Scientists also anticipate climate change will detrimentally affect cities and urban areas. Regional temperature rises will foster more smog. Changes in precipitation will adversely affect urban water supplies. An increase in extreme weather events will cause damage to urban infrastructure; and sea level rise will eventually inundate infrastructure and

settlements in many coastal cities. Local governments, therefore, have plenty of reason to act to avoid the long-term local risks of climate change.

Recognizing that local government actions to reduce greenhouse gases such as energy conservation, trip reduction, and waste reduction can provide multiple local benefits such as decreased air pollution, increasing landfill life, and saving money, in 1999, the City adopted a target to reduce citywide greenhouse gas emissions 30% below worst case 2010 levels. As of 2001, citywide reductions equaled 10% of total emissions.

Figure A.12 Fort Collins Greenhouse Gas Reductions in 2001



The City's Energy Management Team, tasked with implementing the City's Local Action Plan to Reduce Greenhouse Gases, prepares a biennial report on progress to date and recommend future actions.

A.2.2 Indoor Air Quality

Indoor air quality is of concern because indoor air is often more polluted than outdoor air and ninety percent (90%) or more of each day is spent in our home, school, workplace, or car. Sources include asbestos from insulation, biological pollutants including molds, carbon monoxide from appliances and heaters, formaldehyde from pressed wood products and building materials, household cleaning products, personal care products, hobby products, lead from old paint and pipes, pesticides, radon gas escaping from basement soils, and smoking cigarettes.

The likelihood of immediate reactions to indoor air pollutants depends on several factors including age and preexisting medical conditions, and can include irritation of the eyes, nose, and throat, headaches, dizziness, and fatigue. Other health effects may show up either years after exposure has occurred or only after long or repeated periods of exposure. These effects, which include some respiratory diseases, heart disease, and

cancer, can be severely debilitating or fatal. There is considerable uncertainty about what concentrations or periods of exposure are necessary to produce specific health problems.

Radon is a naturally occurring gas that is produced in the soil when uranium decays. Radon is the second leading cause of lung cancer. EPA has designated Fort Collins a "high" radon zone. Short-term radon test results in homes indicated that 70% of Fort Collins' homes have levels above 4 pCi/l. This is the level at which EPA recommends taking action. For years, the City of Fort Collins has offered low cost radon test kits and provided home buyers with radon information. Currently City Council is considering requiring radon mitigation systems to be installed in new homes.

Regarding secondhand smoke, numerous studies have found that tobacco smoke is a major contributor to indoor air pollution, and that breathing secondhand smoke is a cause of disease, including lung cancer, in non-smokers.

The City of Fort Collins' role in indoor air quality involves education, incentive, and regulation. General indoor air quality information is provided to the public through brochures, the Web, and community events. The City sells reduced price short-term radon test kits, and offers workshops for radon mitigators. Zero-interest loans are available to low income residents for radon mitigation systems. Starting October 2003, the City has prohibited smoking in all public places with a few minor exceptions.

A.2.3 Visibility

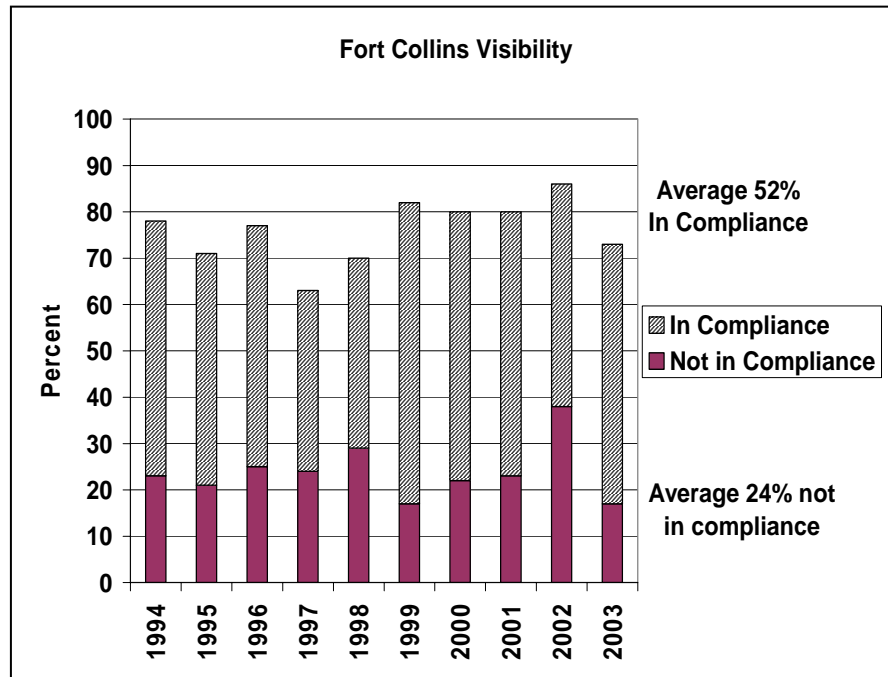
"Visibility" is a measure of how the air looks. It can be described as the maximum distance that an object can be perceived against a background sky. Visibility also can refer to the clarity of objects in the distance, middle or foreground. Visibility is unique among air pollution effects because it involves human perception and judgment.

Along the Front Range, visibility impairment is caused primarily by fine particles (0.1 - 2.5 microns in diameter). Particles this size either scatter or absorb light. Fine particles typically include secondary aerosols and carbon. Secondary aerosols are tiny gas and/or liquid droplets that are formed by chemical reactions between sulfate or nitrate and ammonia. Sulfates are formed when sulfur dioxide (from electric power generation) oxidizes, and nitrates are formed when nitrogen oxides (from vehicle emissions and other high temperature combustion processes) oxidizes. Elemental and organic carbon are most effective at **absorbing** light. Human-caused sources of fine carbon particles include woodburning, emissions from cars, trucks, and buses, and soot from burning fields. Visibility is also degraded by ground level ozone, a photochemical oxidant which contributes to haziness in high concentrations. Ozone is formed when nitrogen oxides and volatile organic compounds (from motor vehicles and industry) combine with sunlight.

In 1986, the Colorado Air Quality Control Commission established a visibility standard for Fort Collins and other Front Range cities. The visibility standard is .076 per kilometer of atmospheric extinction, which means that roughly 7.6% of light is depleted

after traveling through a kilometer of air. The standard equates to a visual range of 32 miles. The standard applies between the hours of 8:00 a.m. and 4:00 p.m., and only when the relative humidity is less than 70 percent. Monitoring for the state visibility standard is not required and there is no penalty for non-compliance. As of October 1998, only two urban areas in the state (Denver and Fort Collins) measure compliance with the State's visibility standard.

Figure A.13 Fort Collins Compliance with Visibility Standard



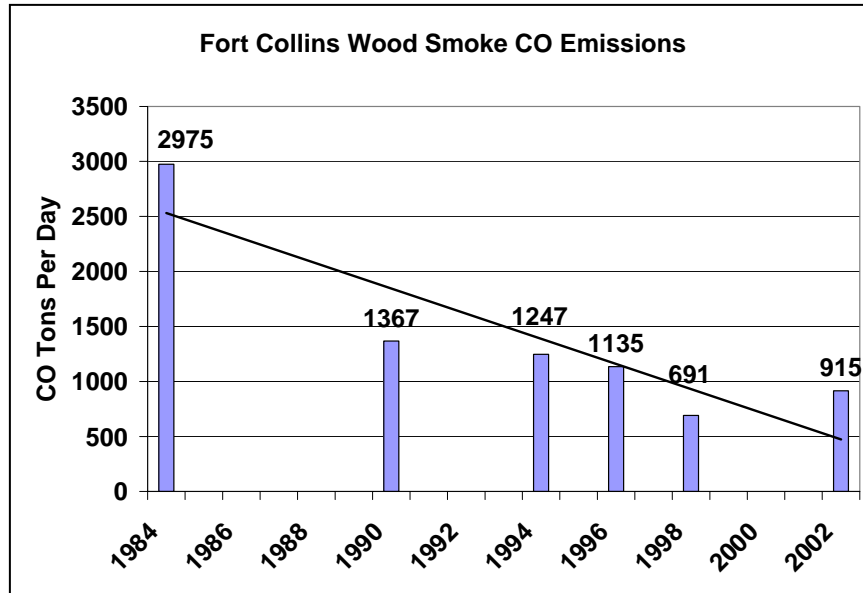
Based on available data, Fort Collins complies with the visibility standard just over half the time. On average, Fort Collins violates the guideline visibility standard twenty-four percent of the time, or roughly one in four days. On average, twenty-four percent of the data are missing, due largely to days with relative humidity greater than 70%, or occasionally due to calibration or malfunction of the monitoring equipment.

A.2.4 Wood Smoke

Wood smoke is a complex mixture of substances produced during the burning of wood. The major emissions from wood stoves are carbon monoxide, organic gases (containing carbon or derived from living organisms), particulate matter, and nitrogen oxides. Wood smoke contains many organic compounds known to cause cancer (such as benzopyrenes, dibenzanthracenes, and dibenzocarbazoles), and other toxic compounds (such as aldehydes, phenols, or cresols). The particulate fraction is composed of solid or liquid organic compounds, soot (elemental carbon – similar to charcoal), and inorganic ash.

The particles in wood smoke are too small to be filtered by the nose and upper respiratory systems, so they wind up deep in the lungs. Wood smoke exposure causes a decrease in lung function and an increase in the severity of existing lung disease with increases in smoke concentrations or exposure time. Although wood smoke potentially affects everyone, children, people with respiratory diseases and the elderly are more likely to be affected. On average, wood smoke emissions have been declining in Fort Collins based on citizen survey data.

Figure A.14 Fort Collins Carbon Monoxide Emission from Wood Smoke



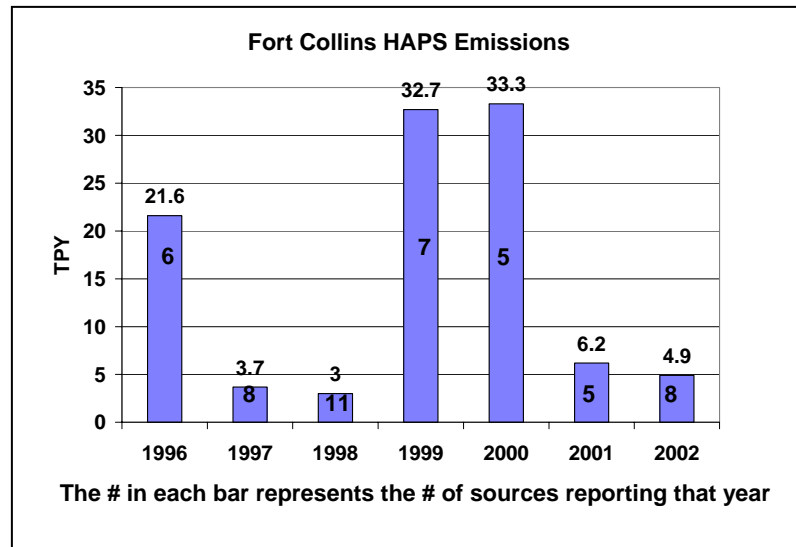
A.2.5 Air Toxics

The 1990 CAAA address a large number of air pollutants that are known to cause or may reasonably be anticipated to cause adverse effects to human health or adverse environmental effects. 188 specific pollutants and chemical groups were initially identified as hazardous air pollutants (HAPs), and the list has been modified over time.

CDPHE's "2001 Report of Urban Air Toxics in Denver" states that the majority of urban air toxics detected in Denver's air can be attributed to auto emissions. Of the few compounds measured that have EPA toxicity benchmarks, formaldehyde, acetaldehyde, 1,3 butadiene, benzene, and carbon tetrachloride are present in Denver's air at levels that may pose health problems. Fort Collins' mobile source toxic emissions may be similar in composition, although perhaps lower in concentration.

HAPS are also emitted by major industrial facilities and power plants as well as from small sources like dry cleaning, gas stations, and auto body painting shops. According to CDPHE's database on permitted sources, local HAPs emissions have declined drastically since 2000. This may be due to new control technology standards or due to increased awareness of HAPs emissions because of the Title V permitting program.

Figure A.15 Fort Collins HAP Emissions



The Toxics Release Inventory (TRI) is a publicly available EPA database that contains information on toxic chemical releases and other waste management activities reported annually by certain covered industry groups as well as federal facilities. Information is based on monitor data or estimates, and reflect emissions levels, not public exposure levels. Table A.2 shows 2000 and 2002 TRI data for Fort Collins.

Table A.2 2000 and 2002 TRI Data for Fort Collins

Zip Code	2000 – # of reporting sources	2000 On- and Off-site emissions (lbs)	2002- # of reporting Sources	2002 On- and Off-site emissions (lbs)
80521	0	NA	0	NA
80524	2	0	0	NA
80525	1	Ethylene glycol = 306 # Hydrogen Fluoride=166 #	3	Ethylene glycol = 500 # Hydrogen Fluoride = 110 # Lead = 13 # N-methyl-2- pyrrolidone=4,024 #
80526	0	NA	0	NA

According to Environmental Defense’s “ScoreCard” Web page evaluating HAPS, diesel emissions are the HAPS that pose the greatest cancer risk in Larimer County. The Web site states that mobile source HAPS contribute 93% of all “added cancer risk” in Larimer County.

Table A.3 HAP Risk in Larimer County

	Contribution to added cancer risk	Contribution to cumulative hazard index
“Industrial” (Point & area sources)	7 %	46%
Mobile Sources	93 %	54%

Source: Environmental Defense’s “ScoreCard”

(http://www.scorecard.org/envreleases/hap/county.tcl?fips_county_code=08069#hazards)

A.2.5 Pesticides

All pesticides are regulated under the Federal Insecticide and Rodenticide Act (FIFRA) of 1972. Pesticides include herbicides, biocides, slimicides, etc. FIFRA requires that before selling or distributing a pesticide in the United States, a person or company must obtain a registration or license from the EPA. Before registering a new pesticide or new use for a registered pesticide, EPA must first ensure that the pesticide, when used according to label directions, can be used with a reasonable certainty of no harm to human health and without posing unreasonable risks to the environment. To make such determinations, EPA requires more than 100 different scientific studies and tests from applicants. If pesticides are to be used on food or feed crops, EPA also sets tolerances (maximum pesticide residue levels) for the amount of the pesticide that can legally remain in or on foods. EPA also has the authority to suspend or cancel registrations of a pesticide if subsequent information shows that continued use would pose unreasonable risks. Pesticides are usually suspended in water when applied. The droplet size is large enough that particles settle quickly and they do not remain airborne.

Over 34 Hazardous Air Pollutants (under the Clean Air Act) are also registered as pesticides under FIFRA. As HAPS, these chemicals must be permitted if released to the air over certain amounts (varies by chemical). In some cases there are National Emissions Standards for Hazardous Air Pollutants (NESHAPS), but these only apply to manufacturing facilities.

In Colorado, the state Department of Agriculture has full regulatory authority for FIFRA requirements. The State has promulgated the Pesticide Act and the Pesticide Application Act. Table A.4 shows pesticides most commonly used by commercial applicators in Larimer County in 1997.

Table A.4 Top Ten Pesticides in Larimer County (1997)*

	Agricultural Use	Turf & Ornamental	TOTAL oz. applied
carbaryl	5,334	144,832	150,166
sulfur	132,855		132,855
glyphosate	16,705	70,936	87,641
propargite	78,988		78,988
pendimethalin	4,269	57,014	61,283
2,4-D	56,787	2,201	58,988
cyanazine	49,296		49,296
petroleum distillate		47,754	47,754
EPTC	39,078		39,078
chlorpyrifos	2,411	34,128	36,539

* Structural application excluded from these numbers. Data were collected from commercial applicators.

The State of Colorado also operates a Pesticide Sensitivity Registry, where sensitive individuals can receive 24 hours advance notice of pesticide application by turf and ornamental applicators.

According to a recent survey, 75% of households used at least one pesticide product indoors during the past year. Products used most often are insecticides and disinfectants. Another study suggests that 80% of most human exposure to pesticides occurs indoors, and that measurable levels of up to a dozen pesticides have been found in the air inside homes.

A.3 AIR QUALITY INDICATORS

When measuring progress toward achieving goals, air quality indicators are often used. Indicators are indirect measurements of air quality that focus on parts of the problem within human control, whereas ambient data include issues outside our control, such as the effects of weather. The 2000-2003 Air Quality Action Plan contained several policy-based air quality objectives, and associated indicators. Progress in achieving those indicators is discussed in this section.

A.3.1 VMT Growth

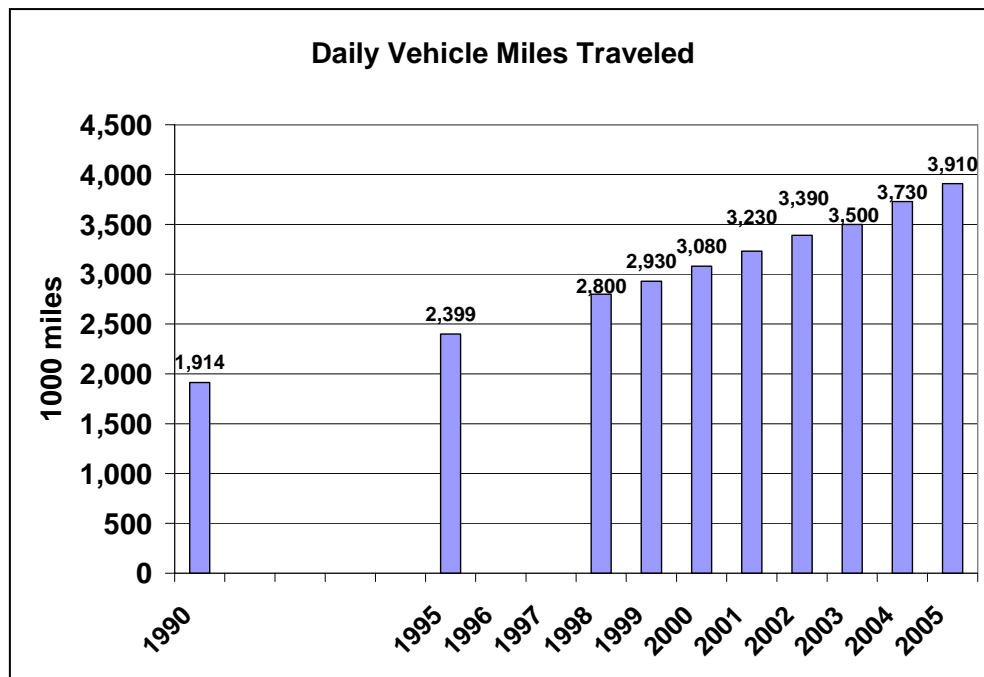
Policy Basis: *Reduce rate of growth of total vehicle-miles of travel in the Fort Collins*

Objective: **Reduce Growth Rate of VMT**

Indicator: **Miles per day**

Status: The rate of VMT growth has been increasing nearly twice as fast as the population growth rate, as illustrated by Figure A.17. The VMT growth rate used in the 2025 NFR Regional Transportation Plan was 2.9 percent/year. The VMT growth rate estimated by the City's LUTRAQ Team for the period 1990-1998 is 4.9% per year; indicating a significant increase in the rate of VMT growth.

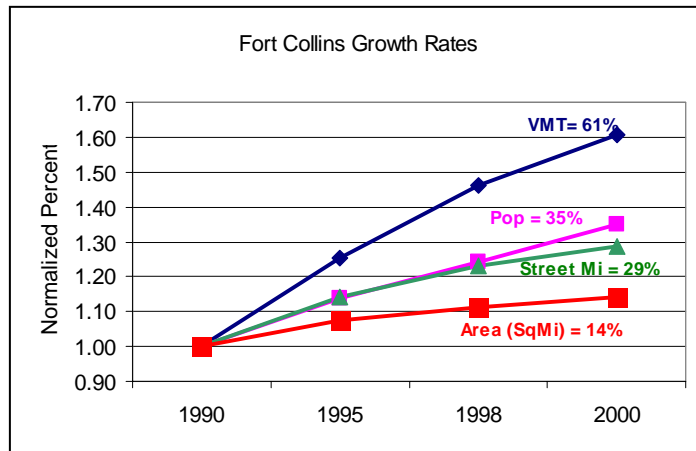
Figure A.16 VMT Growth Trend in Fort Collins



1990 and 1995 data source: MPO Regional Transportation Plans

1998-2005 data source: Estimation of VMT and VMT growth rate; City of Fort Collins LUTRAQ Team; June 22, 2001

Figure A.17 Fort Collins VMT Growth vs. Population Growth



Source: City of Fort Collins 2002 Trends Report, Advanced Planning Department

A.3.2 Tailpipe Emissions

Policy basis: Continually reduce tailpipe emissions of high-priority pollutants, including CO, fine particulates, air toxins, and VOC’s (gm/mi)

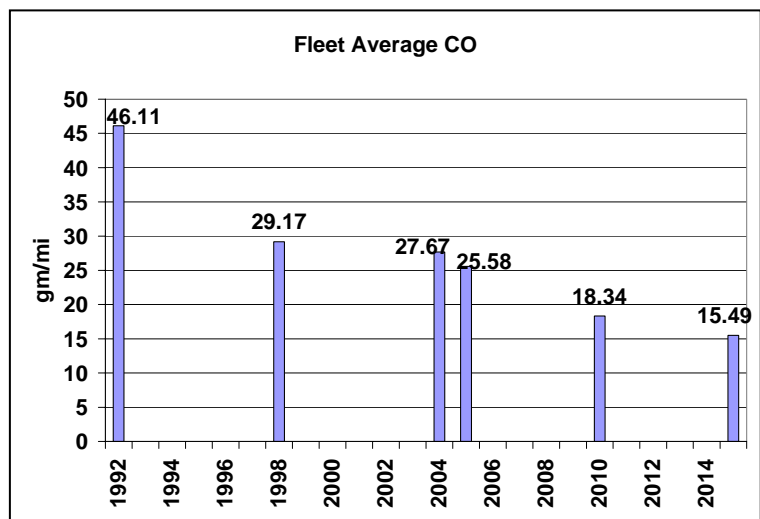
Objective: Reduce Per-Mile Motor Vehicle Emissions

Indicator: g/mi as determined with EPA’s Mobile Model

Status: Fort Collins per-mile emissions of carbon monoxide are decreasing. Per-mile trend data for hydrocarbons, Nitrogen oxides, and particulates are not available.

Figure A.18 Fort Collins Per-mile Carbon Monoxide Emissions

Modeling was done using EPA’s Mobile 6. Emissions inventories for the years 2004 thru 2015 incorporate no control strategies. (i.e. Auto Inspection and Maintenance and Oxy-fuels programs are removed). The reduction in CO is largely attributable to federal new car emission standards. The Inspection and Maintenance program also played a role.



Source: CO Redesignation Request and Maintenance Plan for Fort Collins Area. CDPHE, July 18, 2002

A.3.3 Total Motor Vehicle Emissions

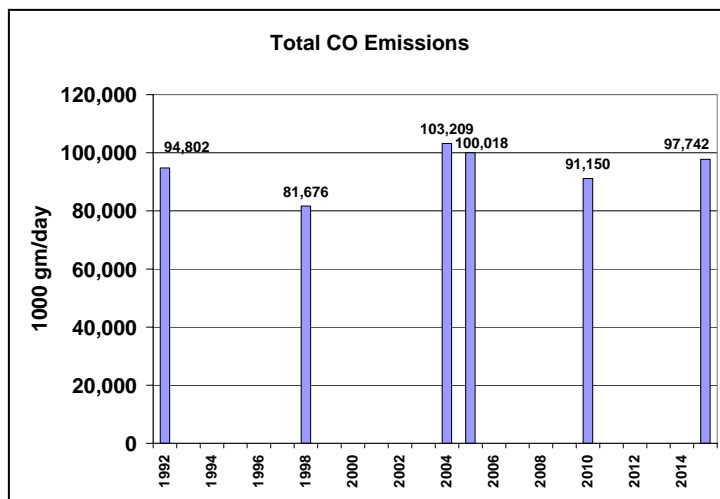
Policy basis: *Continually prevent total motor vehicle emissions of high priority pollutants from rising above the low point, projected to occur in 2000*

Objective: Prevent Total Motor Vehicle Emissions from Increasing After Year 2000

Indicator: Emissions level not increase after 2000

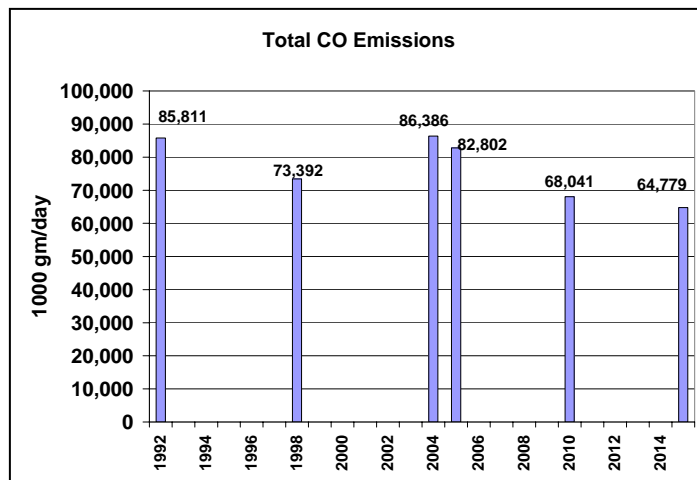
Status: Multiplying the daily VMT by the fleet average grams per mile projected by EPA’s Mobile model, it appears carbon monoxide levels will increase in 2004.

Figure A.19 Total Carbon Monoxide Emissions in Fort Collins (LUTRAQ VMT)



Source: Using LUTRAQ-based VMT estimates projected at 4.9%/year from 1998

Figure A.20 Total Carbon Monoxide Emissions in Fort Collins (CDPHE VMT)



Source: Using VMT estimates from the 2002 CO Maintenance Plan

A.3.4 Commercial and Industrial Emissions

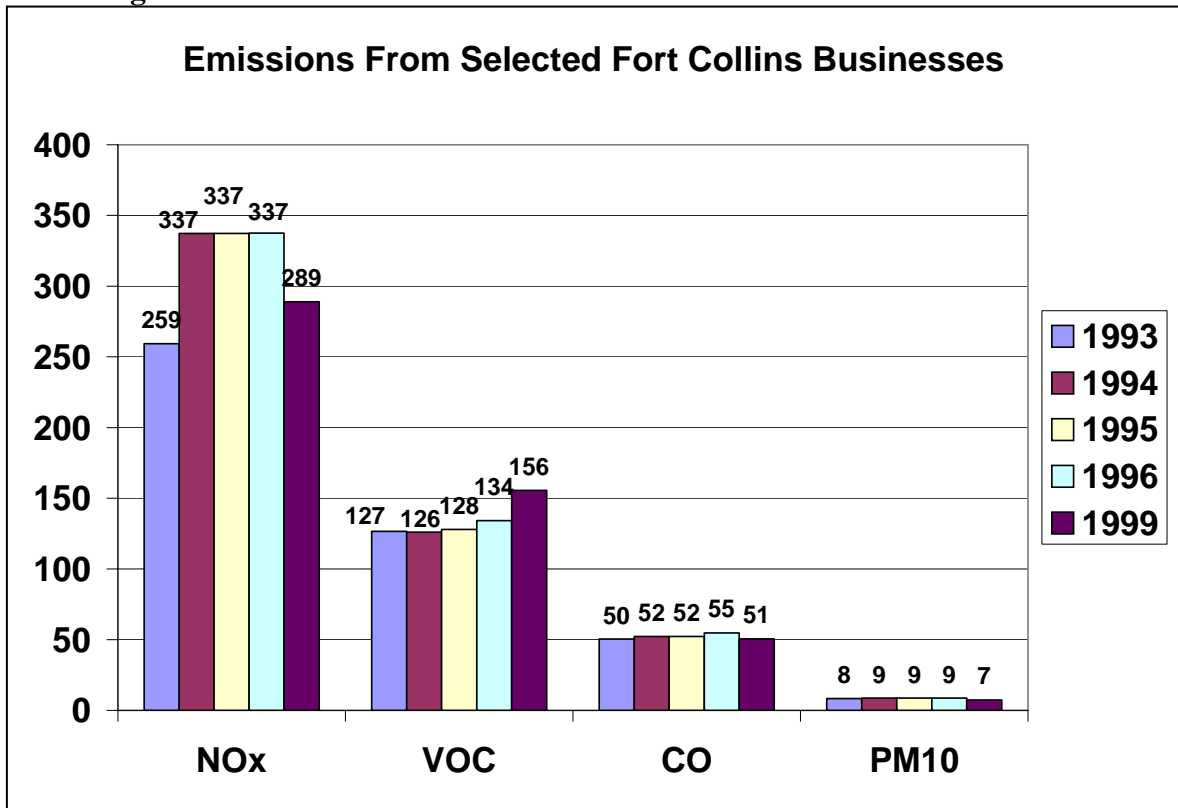
Policy basis: *Continually reduce total emissions of high priority pollutants from commercial and industrial sources in the Fort Collins UGA, including CO, fine PM, air toxins, and VOC.*

Objective: Reduce total emissions from Commerce and Industry

Indicator: Tons/day of CO, PM_{2.5}, air toxics, and VOC's.

Status: Figure A.21 shows emissions from selected Fort Collins businesses (CSU, Anheuser Busch, Hewlett Packard, Poudre Valley Hospital, City Wastewater Treatment, Symbios Logic (LSI)). Carbon monoxide emissions have been steady over time, while emission of volatile organic compounds have increased.

Figure A.21 Fort Collins Commercial and Industrial Emissions



Source: AIRS (EPA's Aerometric Information Retrieval System)

A.3.5 Area-wide Wood Smoke

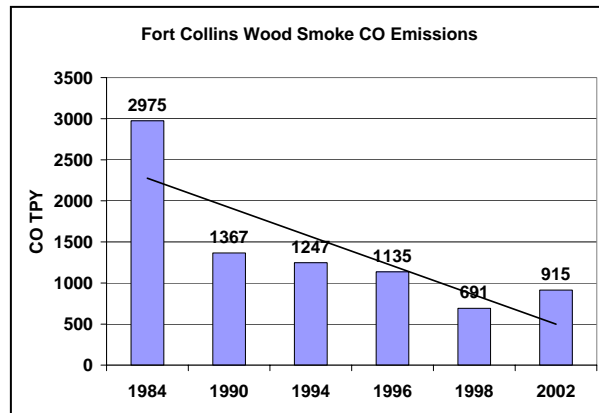
Policy basis: *Reduce area-wide wood smoke emissions.*

Objective: Reduce Area-wide Wood Smoke Emissions and the Number of Non-certified Wood stove and Conventional Fireplaces.

Indicator: Area-wide wood smoke emissions declining
Number of non-certified stoves declining

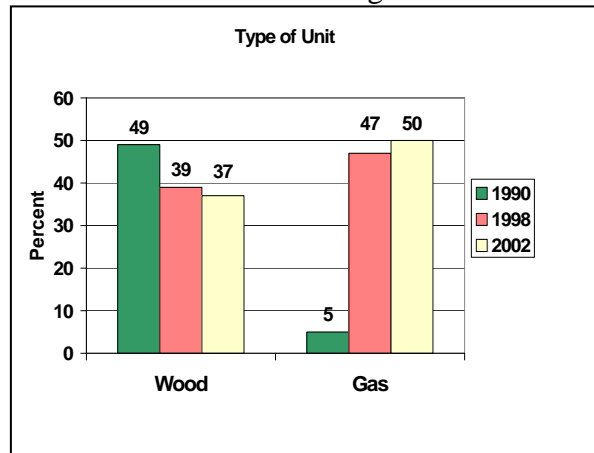
Status: Figure A.22 shows that carbon monoxide emissions associated with woodburning have declined over time. Carbon monoxide is a reasonable surrogate for other wood smoke emissions such as fine particles because they are both a function of the amount of wood burned. Figure A.23 shows that use of wood-burning devices has been declining over time, although it does not directly quantify the number of non-certified stoves.

Figure A.22 Fort Collins Wood Smoke Carbon Monoxide Emissions



Source: Fort Collins Outdoor Air Quality Survey Data

Figure A.23 Use of Wood-burning Devices in Fort Collins



Source: Fort Collins Outdoor Air Quality Survey Data

A.2.6 Indoor Air Quality

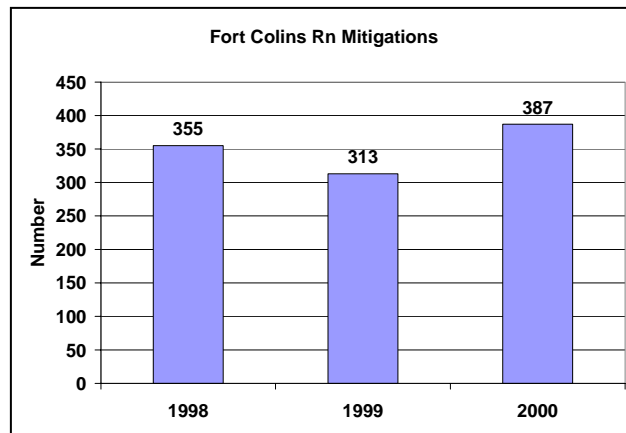
Policy basis: *Increase the percentage of residences taking action to reduce exposure to indoor air pollution.*

Objective: Increase Actions by Residences and Workplaces to Reduce Exposure to Indoor Air Pollution

Indicator: Radon Reduction Actions

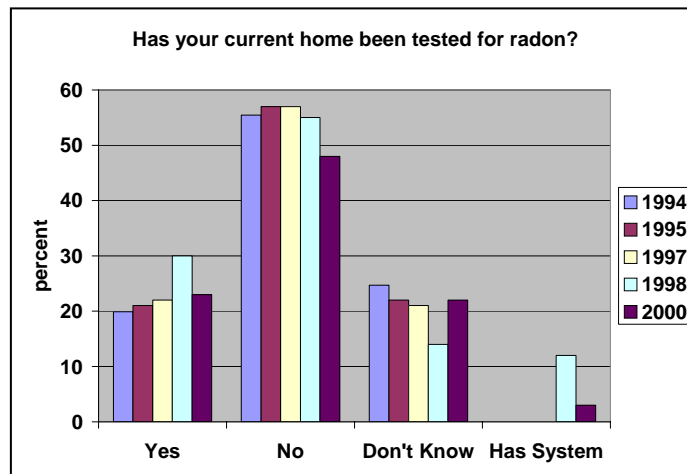
Status: According to Figures A.24 and A.25, the number of radon mitigations is slightly increasing, and the number of known homes testing is slightly increasing. More current data are needed to accurately assess trends in radon-related actions.

Figure A.24 Radon Mitigations in Fort Collins



Source: Radon Program Review, City of Fort Collins NRD, March 2001

Figure A.25 Radon Testing in Fort Collins



Source: Indoor Air Quality Survey 2000 Report: City of Fort Collins (12/01)

A.4 EMISSION INVENTORIES

Emissions inventories can be used to estimate how much pollution is emitted into the air. These estimates are based on many factors, including actual monitored readings at emission stacks, levels of industrial activity, fuel consumption, vehicles miles traveled, and other activities that cause pollution. Table A.5 below shows emission sources for air pollution in Larimer County in 2001.

Table A.5 2001 LARIMER County Emission Inventory (Tons per Year)

CATEGORY	CO	NOX	PM10	SO2	VOC	Benzene
Agriculture	0	0	1,279	0	0	0
Aircraft	249	1	0	0	8	1
Aviation Gasoline Distribution	0	0	0	0	0	3
Construction	0	0	5,635	0	0	0
Forest & Structure Fires	2,734	78	255	2	375	22
Fuel Combustion	86	409	99	53	2	0
Prescribed Fire	142	2	11	0	4	1
Railroads	6	66	1	1	2	7
Solvent Utilization	0	0	0	0	1,725	5
Surface Coating	0	0	0	0	641	1
Unpaved Airstrips	0	0	8	0	0	0
Woodburning	2,524	40	377	6	2,037	23
Area TOTAL	5,741	596	7,665	62	4,794	63
Highway Vehicles	47,840	5,292	141	212	3,217	103
RoadDust	0	0	3,087	0	0	0
On-Road TOTAL	47,840	5,292	3,228	212	3,217	103
Lawn and Garden (comm)	9911	207	35	6	867	19.63
Lawn and Garden (res)	2917	37	4	1	221	6.54
Other Non-road	7193	1,325	118	29	992	23
Non-Road TOTAL	20,021	1,569	157	36	2,080	49
Stationary TOTAL	601	4,937	1,067	1,543	1,556	15
Biogenics	0	974	0	0	53,778	0
TOTAL	74,203	13,368	12,117	1,853	65,425	230

Source: <http://emaps.dphe.state.co.us/APIInv/viewer.htm>

Table A.6 on the next page shows the sources of greenhouse gas emissions (carbon dioxide and methane) in Fort Collins in 2002.

Table A.6 Fort Collins 2002 Greenhouse Gas Emission Sources

Sector	Tons GHG	Percent
Residential	508,535	23%
Commercial	419,362	19%
Industrial	484,655	22%
Transportation	754,706	34%
Solid Waste	20,554	1%
TOTAL	2,187,812	1

Source: City of Fort Collins 2001/2002 Climate Protection Status Report

A.5 TRENDS AND EMERGING ISSUES

A.5.1 Ozone

National air quality levels measured at thousands of monitoring stations across the country have shown improvements over the past 20 years. However, of all six principal pollutants tracked, progress has been slowest for ground-level ozone. According to EPA's "2002 Air Trends Report", the national average ozone (8-hour) levels have been fairly constant in many metropolitan areas. An analysis to adjust 8-hour ozone levels in metropolitan areas to account for the influence of meteorological conditions shows the 10-year trend to be relatively unchanged. At the same time, for many national parks, the 8-hour ozone levels have increased slightly.

This national trend for ozone is mirrored in Colorado. During the summer of 1998, a heat wave caused ozone levels to rise along the Front Range. Again during the summer of 2003, especially high temperatures caused exceedances of the 8-hour ozone standard at numerous monitoring sites along the Front Range, including Fort Collins. Three monitoring locations in Denver actually recorded violations of the ozone standard. Greeley and Rocky Mountain National Park are extremely close to violating the standard.

In December 2002, state and regional agencies entered into an "Early Action Compact" with EPA. Under this agreement, a non-attainment designation for ozone is deferred until 2007, as long as several milestone are met. These include:

- Developing an emission inventory and modeling
- Identifying strategies that will bring the area into attainment by 2005
- Implementation of these measures no later than December 31, 2005
- Additional modeling ensuring the area will remain in attainment of the 8-hour standard for 2008-2012.

In December 2003, EPA proposed that Larimer, Weld, Morgan and Elbert counties also be included in the ozone non-attainment boundary. This is because emissions from these areas contribute to the ozone problem. In early 2004, all four counties joined the Ozone Early Action Compact. The EPA decision on the ozone non-attainment area boundary will be finalized in April 2004. It is extremely likely Fort Collins will be included within the deferred 8-hour ozone non-attainment area.

The U.S. EPA holds the State of Colorado responsible for bringing any areas with the state into attainment. The Colorado Air Quality Control Commission, the state legislature, and ultimately the U.S. EPA must approve an “Ozone Action Plan” to bring the area into attainment. The Air Quality Control Commission then promulgates regulations necessary to implement actions identified in the Ozone Action Plan. The role of local government is to participate in the development of the Ozone Action Plan and to encourage businesses and citizens to reduce ozone-forming pollutants through education and incentive programs.

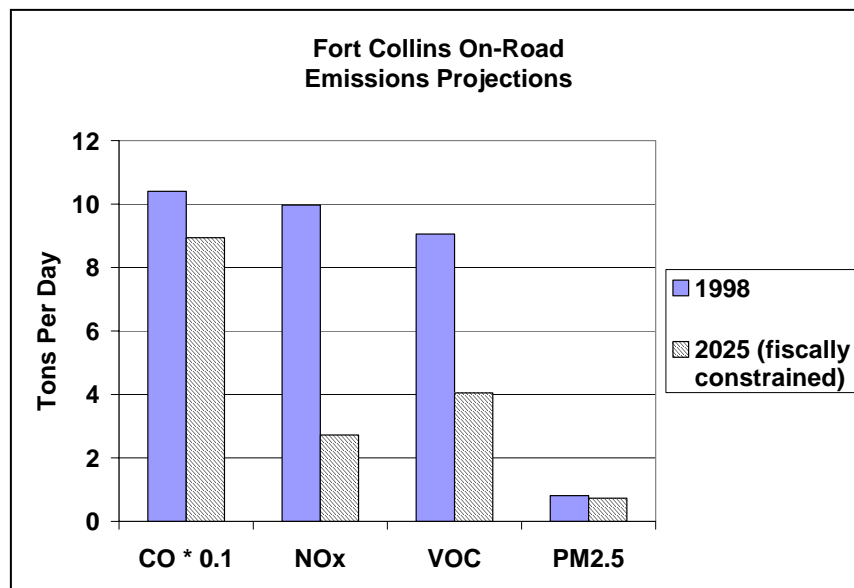
A.2.5 Shift in Primary Emissions Sources

With the exception of the greenhouse gas carbon dioxide, tailpipe emissions from individual vehicles have been declining as a result of federal new car emission standards. Indeed, by 2025, modeling shows motor vehicle emissions collectively will have declined significantly, as illustrated in Figure A.26.

Consequently, the relative contribution of non-road emissions to Fort Collins’ air pollution will increase, as illustrated by Figure A.27. Non-road sources include construction equipment (heavy equipment, generators, forklifts), lawn and garden equipment, farming and mining equipment, recreational vehicles (dirt bikes, etc.), and locomotive and aircraft emissions. EPA is considering tighter controls for diesel non-road engine, but they will not come into effect for several years.

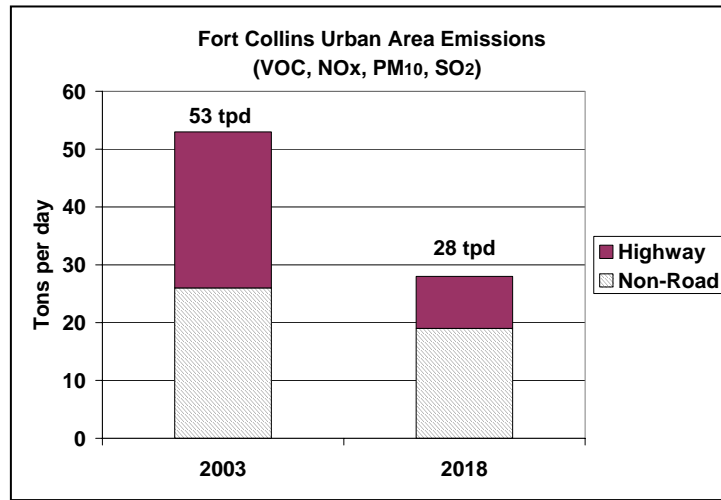
This means that over the next decade, Fort Collins will need to shift some of the focus of air quality protection efforts onto non-road sources of pollution.

Figure A.26 Fort Collins On-Road Emission Trends



Source: Fort Collins Transportation Master Plan, Appendix C (January 2004 draft)

Figure A.27 Fort Collins On-Road vs. Off-Road Emissions

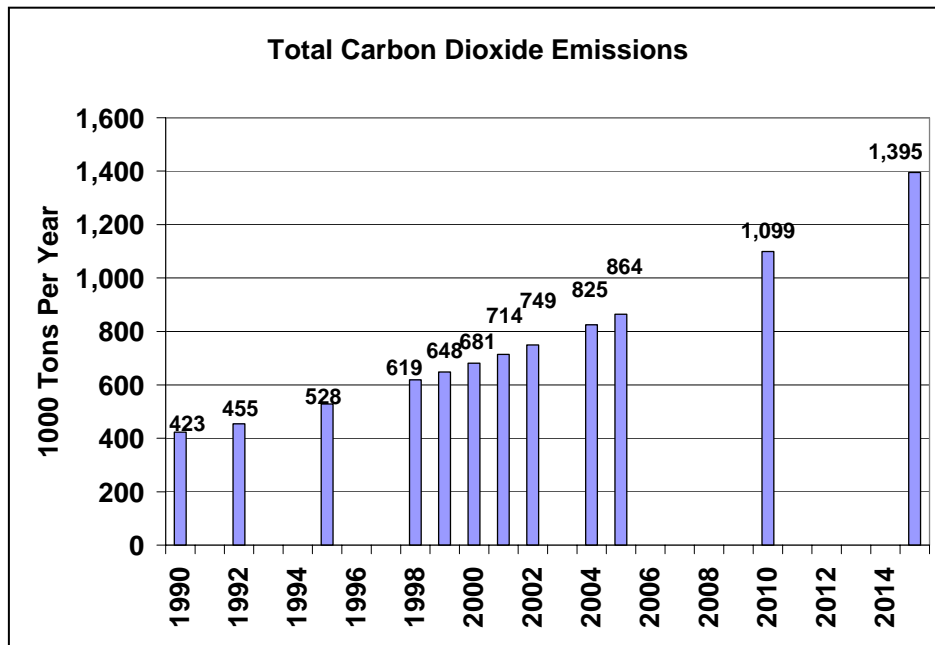


Source: ENVIRON Analysis for Western Regional Air Partnership, 2002

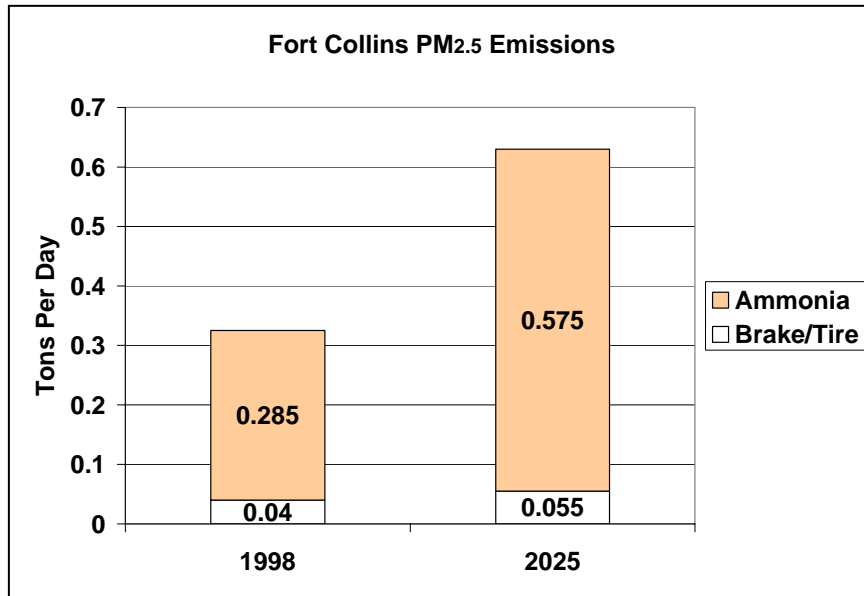
A.2.5 VMT Growth Remains an Issue for Certain Air Pollutants

As discussed in section A.2.5, most tailpipe emissions show declining trends in the future. This is not true for all motor vehicle emissions, however. Models predict increases Fort Collins’ carbon dioxide emissions, the most prevalent human-caused greenhouse gas, as illustrated in Figure A.28. Figure A-29 shows predicted increases in Fort Collins ammonia emissions and fine particle emissions that result from brake and tire wear.

Figure A.28 Predicted Increase in Motor Vehicle Carbon Dioxide Emissions



Source: LUTRAQ VMT Growth estimates with CO₂ factor for 2002 fleet

Figure A.29 Predicted Increase in Certain Types of Fine Particle Emissions

Source: 2004 Fort Collins Transportation Master Plan, Appendix C

A.6 Citizen Perspectives on Air Quality

Citizen surveys are periodically conducted to learn citizen views regarding air pollution, what citizens' feel should be done about air pollution, their willingness to participate in solutions, and effectiveness of City outreach efforts. The last air quality survey was conducted in 2002. Of 1500 surveys sent to randomly selected households in Fort Collins, 818 completed the surveys, for a 55% response rate. Survey results are highlighted below:

- Residents perceive that the major sources of air pollution in Fort Collins are gasoline and diesel vehicles.
- Most respondents felt the current air quality in Fort Collins is good, yet 62% state that air pollution affects them in a negative way.
- The top two negative impacts (as in the past several surveys) were the brown cloud (76%) and obscuring mountain views (70%). Health based impacts such as allergies, respiratory ailments, and burning eyes, have increased as well, as illustrated in Table A.8 below.

Table A.7 Fort Collins Citizen Survey Data

Adverse Affects of Air Pollution	1997	1999	2002
Obscures mountain views	69 %	50 %	70 %
Creates a Brown Cloud	22 %	68 %	76 %
Causes burning itchy eyes, nose	41 %	39 %	76 %
Trigger allergies, respiratory problems	45 %	49 %	57 %
Causes long term respiratory problems	28 %	33%	55 %

- Interestingly, most citizens (62%) believe air quality will get worse in the next five years, that something can be done about air quality (70%), yet few believe something will be done (21%).
- Respondents believed that the City should focus air quality efforts on improving traffic light timing to reduce vehicle idling, increasing enforcement of exhaust regulations, and prohibiting woodburning on high pollution days.
- Most residents would be willing to do something to help reduce air pollution (55%). Preferred actions included keeping their vehicle tuned up (94%), taking the bus if it was more convenient (65%), and reducing the number of miles driven (64%)
- Several factors impact citizen decisions to reduce the daily miles driven. Results show that tax breaks incentives, being able to ride a bike for work or errands, and taking the bus for errands or work if it was more convenient are good predictors of whether a respondent would reduce the number of miles they drive.
- More people believe that Fort Collins is impacting and being impacted by global warming than those who do not believe this.
- Overall, residents agreed (97% - 60%) with current or planned programs. The responses that best predicted whether residents believe the City should be doing more to control air pollution were reduce the brown cloud, reduce local greenhouse gas emissions, increase enforcement of exhaust regulations and the emission law, and decrease wood burning.

APPENDIX B

History of Fort Collins Air Quality Program

History of Fort Collins Air Quality Plan

Prior to the adoption of the City's first official air quality plan, City programs addressed carbon monoxide from cars, wood smoke in neighborhoods, and control of new emission sources through the development review process. The City first adopted its own air quality plan in 1993 in response to City Council priorities that called for expansion and emphasis of the Air Quality Element of the City's Framework for Environmental Action.

The City Council appointed an Air Quality Task Force whose members had a key role in development of the plan: they had the responsibility to recommend the Plan to the Planning and Zoning Board and to City Council. Many interest groups were affected by the Plan because it would amend both the City's Comprehensive Plan and the State Implementation Plan. Interest groups included Fort Collins area civic, business, and environmental groups, City Council Boards (Planning and Zoning Board, Transportation Board, Natural Resources Advisory Board), the North Front Range MPO, County and State Health Departments, and USEPA.

The plan identified high priority pollutants and sources, and set forth goals, objectives, and action strategies for each. Action strategies included policies, incentive programs, performance standards, ordinances, etc. The plan supplemented the State Implementation Plan for carbon monoxide and the 1985 Air Quality Monitoring and Control Plan for the City of Fort Collins.

The new Air Quality Strategic Plan (consisting of the Air Quality Policy Plan and the Air Quality Action Plan) addressed three issues. First, it provided a more comprehensive planning framework to protect air quality over the long term. Second, it integrated existing strategies and programs with new and/or long-term strategies. Finally, it expanded air quality programs into new areas of concern, such as visibility reduction, air toxics, and greenhouse gasses.

Since the adoption of the first Air Quality Action Plan, it has been periodically updated by City Council. Table B.1 shows the timeline of City action quality efforts.

Table B.1 Air Quality Planning Efforts

Year	What
1985	Fort Collins Air Quality Monitoring and Control Plan
1992	Framework for Environmental Action (Air Quality Element)
1993	Air Quality Policy Plan (AQPP) adopted
1994-'95	Air Quality Action Plan (AQAP)
1995	Congestion Management Plan adopted, with complementary goals to reduce VMT growth
1996-'98	Air Quality Action Plan Update
1997	City Plan adopted (air quality policies incorporated)
1999	Air Quality Action plan Update
2000-'03	Air Quality Action plan Update
2004	2004 Fort Collins Air Quality Plan (combining policy and implementation)

APPENDIX C

Resolution 2004-072 Approving and Adopting Air Quality Policies

RESOLUTION 2004-072
OF THE COUNCIL OF THE CITY OF FORT COLLINS
APPROVING AND ADOPTING CHAPTER 3 – AIR QUALITY POLICY
OF THE AIR QUALITY PLAN
AS A POLICY ELEMENT OF THE CITY’S COMPREHENSIVE PLAN

WHEREAS, a statistically significant survey in 2003 revealed that the citizens of Fort Collins view the air quality program as being critical to the protection of their quality of life; and

WHEREAS; citizens of Fort Collins want local government to play an important role in protecting air quality; and

WHEREAS, an Air Quality Policy Plan was originally adopted on February 22, 1993, by the Planning and Zoning Board as an element of the Comprehensive Plan, and approved on March 16, 1993, by Fort Collins City Council; and

WHEREAS, all but the findings of the Air Quality Policy Plan (all the policies) were readopted by City Council on February 18, 1997, with minor revisions as Section ENV-1 of City Plan "Principles and Policies"; and

WHEREAS, in addition to the Air Quality Policy plan, City staff has in the past worked with the public, the Air Quality Advisory Board and other advisory boards and the City Council to prepare and update every two to four years an Air Quality Action Plan to provide a framework for implementation of the Air Quality Policy Plan; and

WHEREAS, beginning in 2003, City staff has worked with the public, the Air Quality Advisory Board, and other Council advisory boards to evaluate those policies and recommend updates to them as needed; and

WHEREAS, in order to streamline the planning process and provide for more frequent City Council review of air quality policies, staff and the Air Quality Advisory Board have recommended that the Air Quality Action plan be merged together with the Air Quality Policy Plan into an Air Quality Plan; and

WHEREAS, it is staff’s recommendation hat the policy portion of the Air Quality Plan be represented to City Council for regular review and update as part of the City’s Comprehensive Plan every five years; and

WHEREAS, on April 6, 2004, City Council adopted ten air quality principles and policies that address transportation, land use, and greenhouse gases in Sections ENV-1, ENV-2, and ENV-3 of City Plan "Principles and Policies"; and

WHEREAS, Chapter 3 of the 2004 Air Quality Plan contains those ten ENV air quality polices as well as twenty-three additional air quality policies (AQ) addressing broad approaches to air quality protection, commercial and residential sources, health, and leadership, such that all

of the City's air quality policies (ENV and AQ) are contained in Chapter 3 of the 2004 Air Quality Plan; and

WHEREAS, the Transportation Advisory Board considered Chapter 3 of the 2004 Air Quality Plan on May 19, 2004, and voted to recommend approval of the transportation-related air quality policies; and

WHEREAS, the Natural Resources Advisory Board considered Chapter 3 of the 2004 Air Quality Plan on June 2, 2004, and voted to recommend its adoption; and

WHEREAS, the Air Quality Advisory Board considered Chapter 3 of the 2004 Air Quality Plan on June 8, 2004, and voted to recommend its adoption; and

WHEREAS, the City Council has determined that adoption of the air quality policies contained in Chapter 3 of the 2004 Air Quality Plan is in the best interest of the citizens of Fort Collins.

NOW THEREFORE, BE IT RESOLVED BY THE COUNCIL OF THE CITY OF FORT COLLINS, COLORADO as follows:

Section 1. The "Chapter 3 – Air Quality Policy" as shown on Exhibit "A" attached hereto and incorporated herein by this reference, is hereby approved and shall supercede the 1993 Air Quality Policy Plan.

Section 2. The "Chapter 3 – Air Quality Policy" as shown on Exhibit "A" attached hereto and incorporated herein by this reference, is hereby adopted as an element of the City's Comprehensive Plan.

Section 3. That the City Manager is hereby authorized to administratively update and modify implementation aspects of the Air Quality Plan, in the place of an Air Quality Action Plan, provided that such implementation shall be consistent with the Air Quality Policy adopted by this Resolution and with any applicable budget and appropriations.

Passed and adopted at a regular meeting of the Council of the City of Fort Collins, Colorado held this 15th day of May, A.D. 2004.

Mayor

ATTEST:

City Clerk