Supplement to the Washington State Implementation Plan for the

Vancouver Portion of the Portland-Vancouver AQMA Ozone Maintenance Plan

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Washington State Implementation Plan
Section 4.3.1.OZ.1

Portland-Vancouver AQMA
(Washington portion)

Table of Contents

These Washington Sections correspond with Sections in the Portland Portion of the Portland-Vancouver AQMA. For example, Washington Section 5.0 corresponds with Oregon Section 4.50.5 and includes the Maintenance Demonstration information

List of Tables

List of Figures

Appendices

Acknowledgement and Executive Summary

Acknowledgements

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Executive Summary

The Portland-Vancouver Air Quality Maintenance Area (AQMA) currently meets the National Ambient Air Quality Standard (NAAQS) for ozone. This plan demonstrates the Portland-Vancouver AQMA will maintain compliance with the 8-hour ozone standard through 2015 and meets other EPA requirements.

The 8-hour standard for ozone is 0.08 parts per million (ppm). An ozone reading over this level is an exceedence. An exceedence is not a violation; Only a design value over the standard constitutes a violation. The design value for each monitor in the AQMA is calculated using the 4th highest ozone value, averaged over three years.

The Portland-Vancouver AQMA was designated nonattainment with the 1-hour ozone standard on March 3, 1978 under the Clean Air Act Amendments of 1977. The 1990 Amendments to the Clean Air Act continued the nonattainment designation and classified the AQMA as marginal. EPA determined that the AQMA attained the 1-hour standard as of November 15, 1993.

In 1996, the Southwest Clean Air Agency (SWCAA) and the Oregon Department of Environmental Quality (DEQ) developed ozone maintenance plans that included strategies to reduce ozone precursors and ensure compliance with the 1-hour standard for a ten year period. With EPA's approval of these plans, the AQMA was redesignated to attainment in 1997 and became a 1-hour ozone maintenance area. SWCAA requests that EPA remove the obligation to prepare a second 10-year one-hour ozone maintenance plan since the one-hour standard has been revoked and accept this 8-hour maintenance plan as replacement for the existing contingency plan addressing the 1-hour standard.

In July 1997, the U. S. Environmental Protection Agency (EPA) revised the ozone standard from a one-hour average of 0.12 ppm to an 8-hour average of 0.08 ppm. In 2005, EPA revoked the one-hour ozone standard. The strategies identified in the 1996 plans have been successful in reducing smog forming emissions and no violations of the ozone standards have occurred in the Portland-Vancouver area since 1998. The last violation occurred in 1998 when the one-hour ozone standard was temporarily revoked so the one-hour ozone contingency plan was not triggered. DEQ and SWCAA determined that no further controls were necessary because all emission reduction measures had not been fully implemented. The last violations of the 1-hour standard were in the Portland area at the Carus site. No violations of the 8-hour standard have occurred.

Therefore, the Portland-Vancouver AQMA was designated a maintenance area for the 1-hour ozone standard and currently is an attainment area for the 8-hour ozone standard. EPA's implementation requirements for the 8-hour ozone standard require areas so designated to develop a plan that demonstrates continued maintenance of the standard for a period of 10-years after designation of attainment and contains contingency measures. EPA designated the Portland-Vancouver AQMA in attainment effective June 15, 2004. This plan demonstrates compliance with the 8-hour ozone standard through 2015 and fulfills requirements established in Section 110(a)(1) of the Clean Air Act. Both the Vancouver and the Portland areas are included in the ozone modeling and maintenance demonstration.

This is the ozone maintenance plan for the Vancouver portion of the Portland-Vancouver AQMA prepared by the Southwest Clean Air Agency in Vancouver, Washington for adoption into the Washington State Implementation Plan (SIP).This 2006 maintenance plan maintains the existing strategies adopted for the Portland-Vancouver AQMA in the 1996 Ozone plan to reduce and manage volatile organic compounds (VOC) and nitrogen oxide (NOx) emissions.

Transportation Conformity Rules, included as control strategies in the previous ozone plan, no longer to apply to the Portland-Vancouver AQMA since it is an attainment area for the 8-hour ozone standard.

The following control strategies support the Portland-Vancouver Ozone Maintenance Plan and currently apply to sources in the Vancouver area.

- Motor Vehicle Emission Inspection Program (WAC 173-422)
- Control Strategies/Programs supported by SWCAA General Air Pollution Regulations (SWCAA 400)
  - Air Discharge Permit Applications (Notice of Construction) (400-109)
  - New Source Review (400-110)
  - Requirements for New Sources in Nonattainment Areas (400-112)
  - Requirements for Replacement of Substantial Alteration of Emission Control Technology at an Existing Stationary Source (400-114)
  - Maintenance of Equipment (400-116)
  - Requirements for New Sources in a Nonattainment area (400-190)
  - Emission Standards and Controls for Sources Emitting VOCs (SWCAA 490)
  - Emission Standards and Controls for Sources Emitting Gasoline Vapors (SWCAA 491)
  - VOC Area Source Rules (SWCAA 493)

Some sections of the General Air Pollution Regulations will be updated in support of this plan. The following SWCAA 400 sections will be modified:

- Definitions (400-030) - adds ‘emission unit’ to definition of source
- Sources Exempt from Registration Requirements (400-101) - clarifies exemption threshold
- Requirements for New Sources in a Maintenance Plan Area (400-111) - clarifies use of offsets and industrial growth allowance provisions
- Requirement for New Sources in an Attainment or Nonclassifiable Areas (400-113) - describes impact level and offset requirements and use of growth allowance

The following programs, regulations and other anticipated changes described below contribute to emission reductions of ozone precursors but are not relied upon in this plan for the maintenance demonstration:

- Commute Trip Reduction Program (replaced by the CTR Efficiency Act) and CTR performance grants
- Commute Trip Reduction Efficiency Act passed by the Washington state legislature in 2006 to improve transportation system efficiency, conserve energy and improve air quality. It targets urban growth areas with local and regional goals and performance reviews to be every two years – (replaced the old CTR program)
- Public education and outreach including Air Pollution Advisories (formerly Clean Air Action Days), Public Presentations, Public Interaction and Educational Materials.

Other anticipated changes in the future include:

- Implementation of California motor vehicle standards for low emission vehicles beginning with the 2009 model year.
- Vapor recovery systems rules will be modified once the Washington fleet contains sufficient on-board canister systems that capture refueling emissions

Modeled predicted values show that the area will continue to comply with the ozone NAAQS through 2015. The modeling values and actual air quality data show that ozone levels can occasionally approach or exceed the 8-hour ozone standard level in the Portland-Vancouver area. Exceedence of the standard does not constitute a violation of the standard. To be in violation, the design value must exceed 0.085 ppm. The suite of strategies described above will work together to protect air quality as growth and population pressures increase over the next ten years. Implementing this suite of strategies will also reduce emissions of air toxics and greenhouse gases that are important emerging issues of concern.

1.0 Background

Ground level ozone, also known as smog, is an air pollutant formed in the atmosphere by a chemical reaction of volatile organic compounds (VOC) and oxides of nitrogen (NO_x). This reaction is most intense on hot summer days with poor ventilation. Ozone is a strong respiratory system irritant that aggravates respiratory illnesses, impairs athletic performance, and can cause permanent respiratory system damage. Ozone can be especially harmful to older people and children, and can damage crops and other materials.

1.1 Portland-Vancouver AQMA

The Portland-Vancouver AQMA was designated 'nonattainment' and was not in compliance with the one-hour ozone standard on March 3, 1978. Over several decades, efforts to reduce smog forming emissions in the Portland-Vancouver area have included a combination of federal, state, and local emission control strategies, including a vehicle inspection and maintenance program for Portland area motor vehicles (1975) and Vancouver area motor vehicles (1993), industrial VOC controls (1978), and area source controls on gasoline station vapors (1991). EPA determined that the AQMA attained the 1-hour standard as of November 15, 1993. The most recent ozone maintenance plans for Portland-Vancouver were adopted by the Oregon Environmental Quality Commission (EQC) on July 12, 1996 and by the Board of Directors of the SWCAA on March 19, 1996. The Portland and Vancouver Interstate AQMA ozone maintenance plans were approved by EPA on May 19, 1997 (62 FR 27204). At that time, the AQMA was redesignated to attainment and became a 1-hour ozone maintenance area. A violation of the one-hour ozone standard did occur in July 1998 at the Carus monitoring site in Oregon (see Appendix 1)[1] . However, the violation occurred during a time when the one-hour ozone standard was temporarily revoked so it did not trigger the one-hour ozone contingency plan. DEQ's analysis that was supported by SWCAA demonstrated that this violation occurred before all emission reduction measures had been fully implemented so no additional measures were needed. Since 1998, there have been no further violations of the one-hour ozone standard. In 1997, the EPA revised the ozone standard from a one-hour average of 0.12 parts per million (ppm) to an 8-hour average of 0.08 ppm. After a lengthy court battle, the courts upheld the 8-hour ozone standard in 2002. EPA adopted rules to implement the 8-hour ozone standard on April 30, 2004, and revoked the one-hour standard effective June 15, 2005. EPA designated the Portland-Vancouver AQMA as "Unclassifiable/Attainment" with the 8-hour ozone standard, effective June 15, 2004 (69FR 23858, April 30, 2004). Under this designation, DEQ and SWCAA are required to submit maintenance plans (110(a) plans) for the Portland-Vancouver AQMA per 40 CFR 51.905(a)(4)(iii). No violations of the 8-hour ozone standard adopted in 1997 have occurred.

EPA rules to implement the 8-hour ozone standard (69 FR 23951, April 30, 2004) require SWCAA to prepare this 2006 maintenance plan update for the Portland-Vancouver area to ensure continued compliance with the 8-hour ozone standard. In accordance with the same EPA rules, SWCAA joins with Oregon DEQ in its request that EPA remove the obligation to prepare a second one-hour ozone maintenance plan. SWCAA further requests that EPA accept the contingency plan in this Maintenance Plan for the 8-hour standard as a replacement for the contingency plan currently in place for the one-hour standard.

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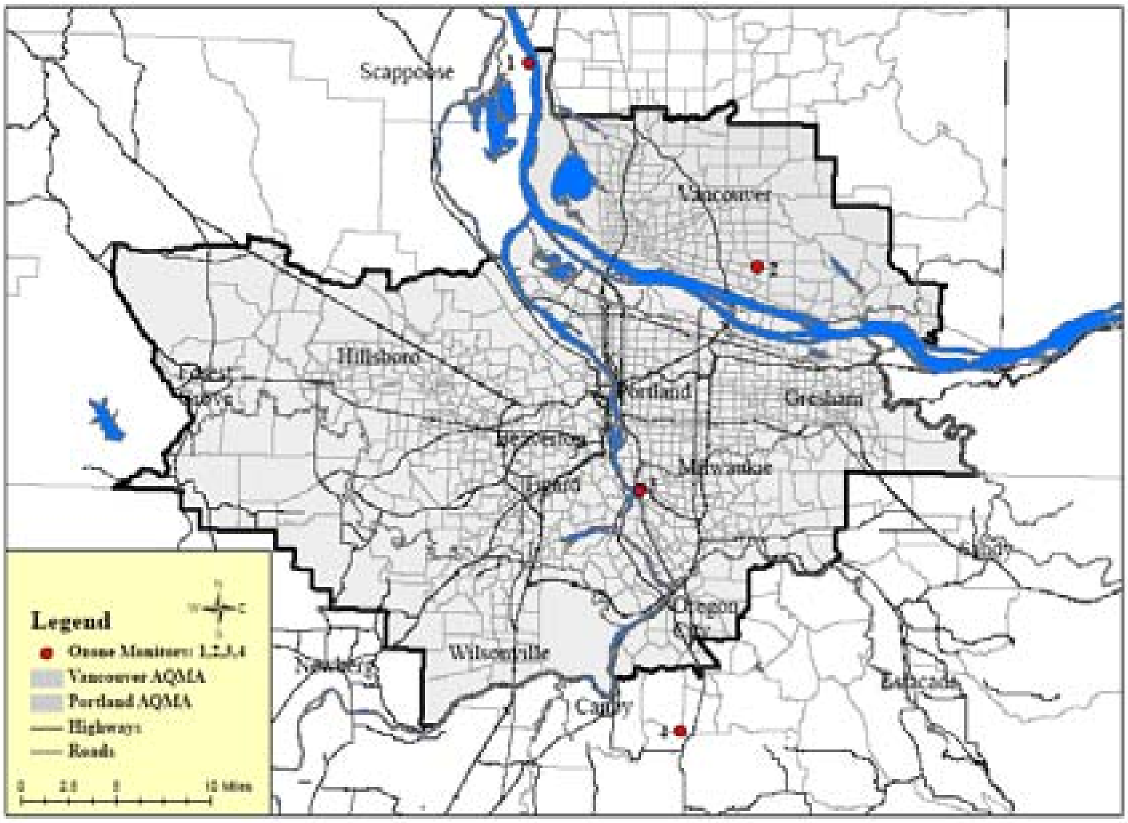
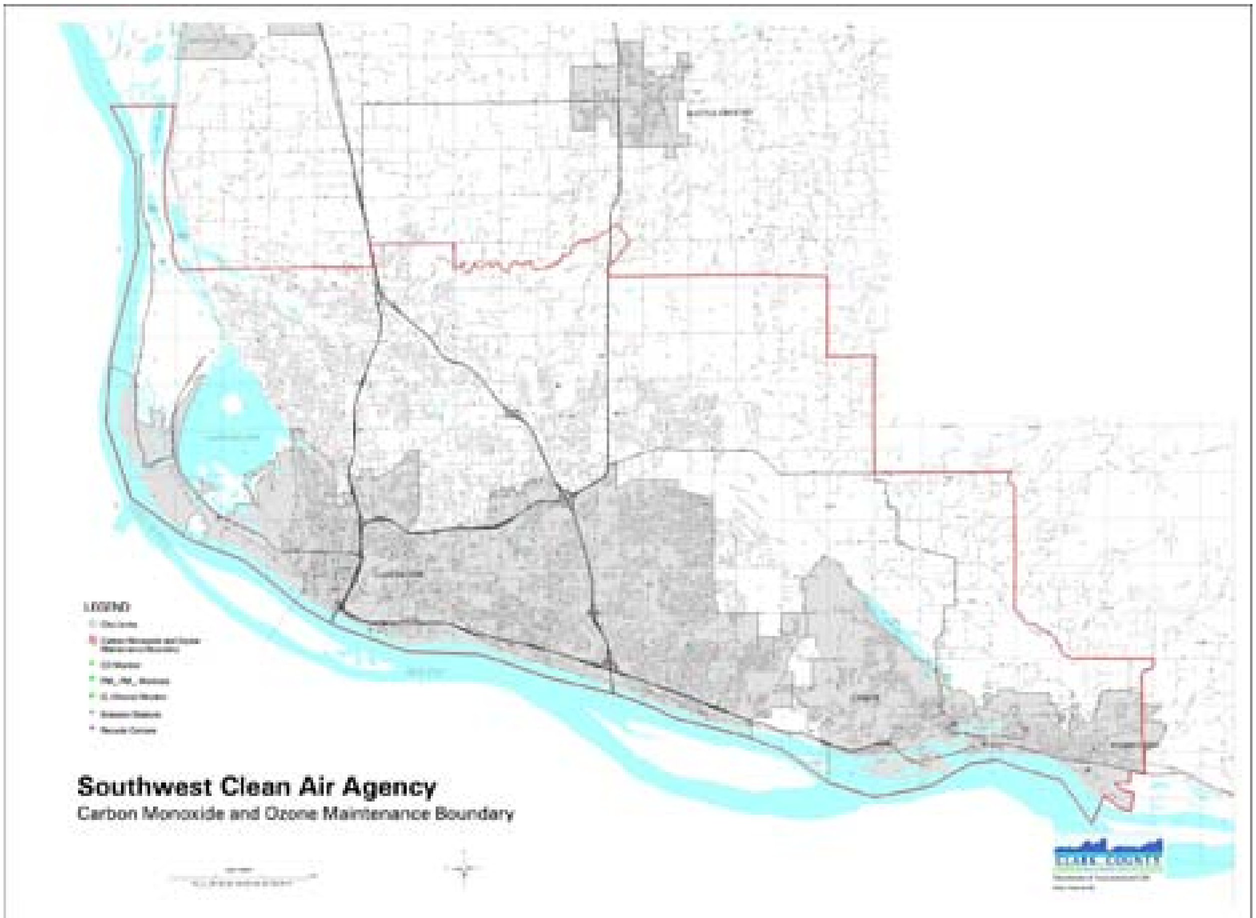
[1] Ozone monitoring sites were established in Oregon beginning in the early 1970s. The current Washington monitoring site was established in 1988.

Figure 1: Portland-Vancouver Interstate Air Quality Maintenance Area (AQMA)



An analysis of meteorological and growth factors indicates that the number of days with elevated ozone levels should have risen over the past several years, but in fact has remained relatively stable (see Appendix 2). This stable ozone trend indicates that the ozone strategies continue to work despite significant population growth in the metropolitan areas and the occurrence of high temperature/air stagnation events that drive ozone formation. Continuing the suite of emission reduction strategies in the Portland-Vancouver AQMA ozone maintenance plan will continue to contribute toward reducing smog forming emissions. Modeling submitted with this plan demonstrates compliance based on these strategies through 2015. Nonetheless, modeled predicted values and air quality data indicate that ozone levels can occasionally approach or even exceed the 8-hour ozone standard in the Portland-Vancouver area. But it is important to note an exceedence of the standard is not a violation of the standard, and that the existing control strategies and other programs will be protective of air quality.

Figure 2. Vancouver Maintenance Boundary
A full page copy of Figure 2 showing the Vancouver Maintenance Area Boundary with a description of the boundary is provided in Appendix 9.



2.0 Ozone Trends and Compliance with Standards

Figure 3 shows the ozone trends measured at monitoring sites for the Portland and Vancouver, areas for the period 1997 through 2005. Table 1 shows the highest maximum 8-hour average ozone concentrations measured for 1998[2], 2003, 2004, and 2005. While these peak values are important in assessing public health risk, they are not used to determine compliance with the federal ozone standard. Compliance with the standard is based on a statistical method that looks at the three year average of the 4th highest (maximum 8-hr avg.) ozone value recorded each year. If the three-year average of the 4th highest value at any monitoring site exceeds the standard, the area is in violation. Table 2 shows the rolling three-year average of 4th high values for 1998, 2003, 2004, and 2005. It is these "design values" that are compared to the 0.08 ppm ozone standard to determine compliance. Under EPA's calculation convention, a value of 0.084 ppm would round down to 0.08 ppm (i.e., in compliance), while a value of 0.085 ppm or higher would be a violation.

Ozone monitoring sites are shown in Appendix 1. The "Mountain View" site is the only site located in the Washington portion of the AQMA.

The values illustrated in Tables 1 and 2, together with the 2015 Maintenance Projection described in Section 5.4 show that ozone levels can still occasionally approach or exceed the 8-hour ozone standard in the Portland-Vancouver area, but that with the existing strategies in place, the region will maintain compliance with the 8-hour ozone standard. SWCAA and DEQ's analysis with Washington State University (WSU), described in Section 5.4, demonstrates compliance so there is not currently a need to add new ozone strategies for the Portland-Vancouver area. Existing emission reduction strategies should be continued to be protective of air quality.

[2] 1998 is included in the table because that year had the most recent violation of the 1-hour ozone standard and the July 1998 episode was used in the modeling analysis

Figure 3: Portland-Vancouver 8-Hour Ozone Values

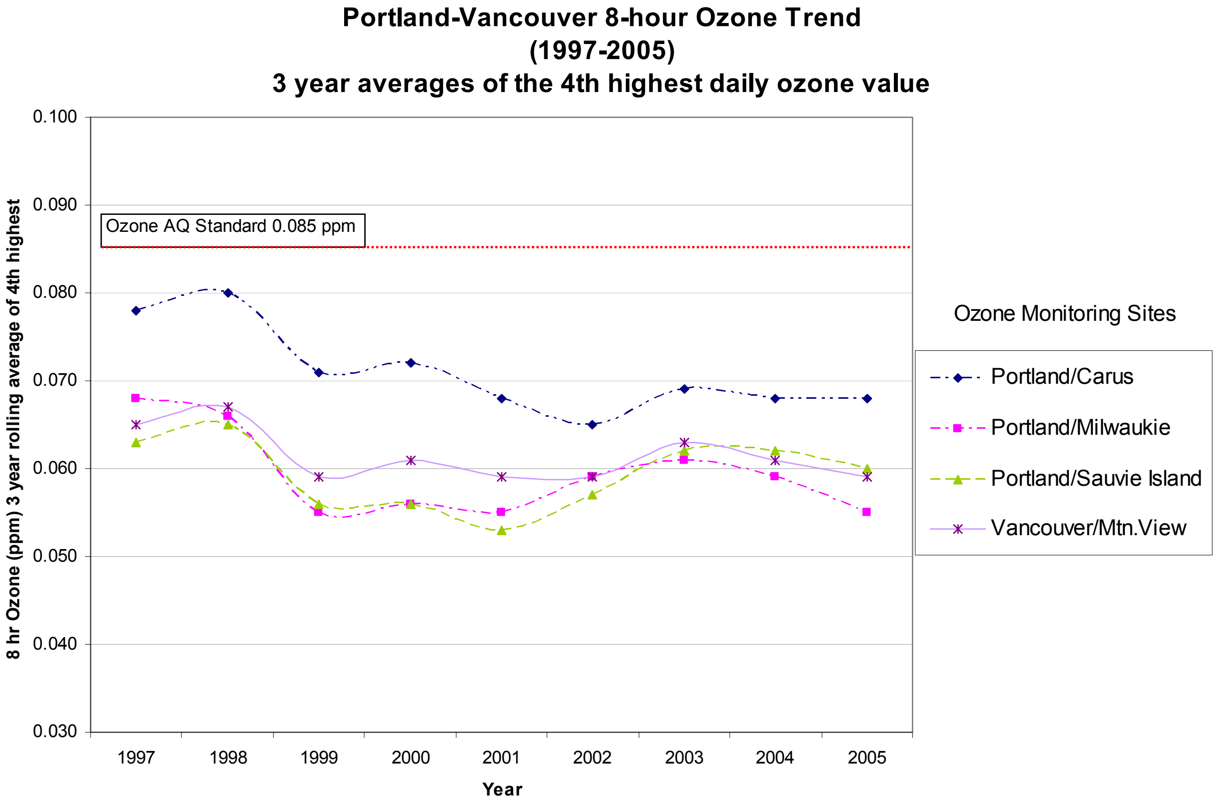


Table 1: 8-Hour Ozone Maximum Values

8-hour ozone standard = 0.08 ppm

Exceedance ≥ 0.085 ppm maximum daily 8-hour average

Monitoring Site	1998 8-hour Maximum	2003 8-hour Maximum	2004 8-hour Maximum	2005 8-hour Maximum
Portland/Carus	0.116	0.084	0.084	0.079
Portland/Milwaukie	0.100	0.068	0.077	0.063
Portland/Sauvie Island	0.077	0.073	0.061	0.064
Vancouver/Mountain View	**0.078**	**0.077**	**0.066**	**0.076**

Table 2: 8-Hour Ozone 4th Highest, Design Values

Design Value = 4th highest 8-hour average, averaged over three years

8-hour ozone standard = 0.08 ppm

Violation ≥ 0.085 ppm design value

Monitoring Site	1998 Design Value	2003 Design Value[3]	2004 Design Value	2005 Design Value
Portland/Carus	0.080	0.069	0.068	0.069
Portland/Milwaukie	0.066	0.061	0.059	0.055
Portland/Sauvie Island	0.065	0.062	0.062	0.061
Vancouver/Mountain View	**0.065**	**0.063**	**0.060**	**0.061**

[3] 2003 Design Value was used to determine the attainment designation for Portland-Vancouver AQMA (January 22, 2004 letter from DEQ to EPA). Design value is calculated using the 4th highest ozone value at each monitoring site, averaged over 3 years.

3.0 Attainment Inventory

SWCAA and DEQ developed an attainment emission inventory for the year 2002. The emission inventory for SWCAA reflects detailed estimates of emissions from all sources, grouped in four major categories:

- Industrial (Point) Sources (e.g., sources inside Clark County with a SWCAA air quality permit),
- On-Road Mobile Sources (e.g., cars and trucks),
- Non-Road Mobile Sources (e.g., lawnmowers, construction equipment and other small engines), and
- Area Sources (e.g., household products, print shops, degreasing and surface coating operations, pesticide application, open burning and wildfires).

The 2002 Consolidated Emissions Reporting Rule (CERR) emissions data submitted by SWCAA and DEQ to EPA's National Emission Inventory (NEI) was used as the basis for the 2002 attainment year inventory. This 2002 county-by-county annual inventory was developed following the currently accepted methodologies for the National Emission Inventory. Appendix 3 and Appendix 4 describe the emissions inventory calculations in more detail.

Table 3 contains the annual countywide emission estimates for the Portland-Vancouver AQMA, Oregon portion (Clackamas, Multnomah and Washington Counties) and Vancouver portion (Clark County) in tons/year. Tables 4 and 5 contain the countywide estimates, seasonally adjusted for a typical summer day in lb/day. Tables 4 and 5 are considered the "attainment inventory" for the Portland-Vancouver AQMA Ozone Maintenance Plan.

EPA guidance requires an emission inventory for three pollutants, VOC, NO_x and carbon monoxide (CO). However, VOC and NO_x are the most critical precursor emissions that contribute to ozone formation, so these pollutants are emphasized in the emission inventory tables throughout this maintenance plan. CO is included in some tables for reference.

Table 3: Portland and Vancouver 2002 Annual Emissions (tons/year)

Portland Area 2002 Attainment Inventory (Clackamas, Multnomah, Washington Counties)

Source Type	2002 VOC	2002 NOx
AREA	92,946	5,808
NON-ROAD	13,247	17,344
ON-ROAD	23,683	36,786
POINT	3,056	2,522
Total	132,931	62,461

Vancouver Area 2002 Emissions (Clark County)

Source Type	2002 VOC	2002 NOx
AREA	11,636	602
NONROAD	1,797	2,859
ON-ROAD	6,274	9,272
POINT	652	1,111
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Total	20,359	13,844

Area source emissions were calculated following EPA guidance for the 2002 NEI. Table 3 shows that area sources were the largest category of VOC emission sources in 2002, but it is important to note that most of the VOC emissions were from woodstoves. The annual area source emissions inventory for 2002 in both Portland and Vancouver includes residential wood stoves, which are a significant emitter of VOCs. However, these stoves are not likely to be in use during ozone episode conditions with temperatures above 90 degrees. Therefore, the summer-seasonal emissions inventory and ozone maintenance modeling demonstration reflecting daily summertime conditions did not include fireplace or woodstove emissions. Other

VOC area sources include painting, surface coating and degreasing operations, print shops and household consumer products.

Non-road mobile source emissions for Vancouver for 2002 were calculated using EPA's draft NONROAD2004 model and other methods following EPA guidance for the NEI. Non-road engines are also significant contributors to both VOC and NOx during the summer ozone season, and sources include aircraft, locomotives and marine engines as well as lawn and garden equipment, construction equipment, boats and personal watercraft.

On-road mobile source emissions for the attainment inventory were calculated using EPA's MOBILE 6.2 model and traffic data from the Southwest Washington Regional Transportation Council (RTC). Gasoline vehicles are a significant source of VOC and NO_x emissions, as are diesel powered vehicles.

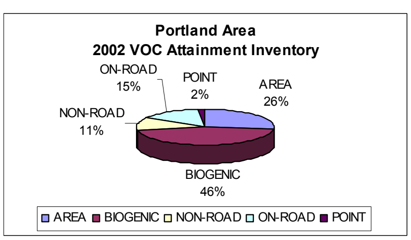
Point source emissions for the 2002 Attainment Inventory are based on data submitted by permitted facilities and reflect actual 2002 emissions reported in annual reports to SWCAA. Within the Portland-Vancouver AQMA, industrial point sources that emit more than 10 tons/year of VOC, 40 tons/year of NO_x, or 100 tons/year of CO were inventoried. Outside of the Portland-Vancouver AQMA but within 25 miles of the attainment boundary, point sources that emit more than 40 tons/year of NO_x or 100 tons/year of VOC or CO were inventoried.

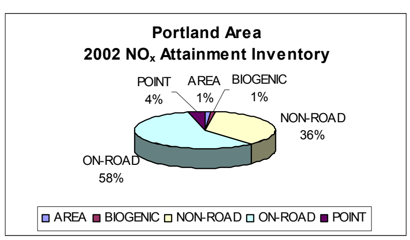
Biogenic emissions are naturally produced by vegetation (e.g., terpenes from pine trees) and can be distinguished from anthropogenic emissions that are produced by human activities. Biogenic emissions data was provided by WSU for the modeling study (Appendix 4) and calculated by county for this emissions inventory.

Table 4: Portland Area 2002 Attainment Inventories (lb/day)

Portland Area 2002 Attainment Inventory
Typical Summer Day, lb/day
Clackamas, Multnomah, Washington Counties

Source Type	2002 VOC	2002 NO_x	2002 CO
AREA	253,871	5,529	26,644
BIOGENIC	437,910	3,890	
NON-ROAD	110,188	136,713	1,202,805
ON-ROAD	139,542	216,750	1,699,493
POINT	17,020	14,913	12,202
Total	958,531	377,794	2,941,144





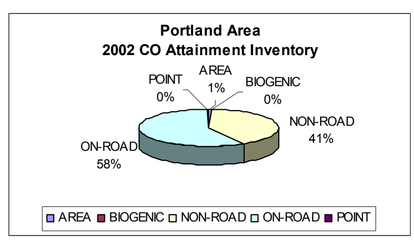
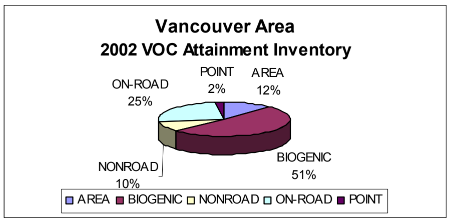
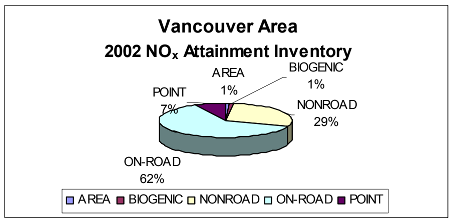


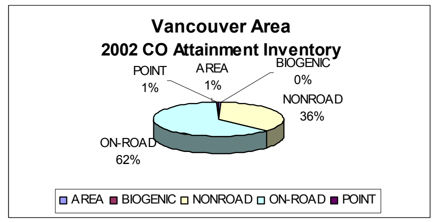
Table 5: Vancouver Area 2002 Attainment Inventories (lb/day)

Vancouver-Area 2002 Attainment Inventory
Typical Summer Day, lb/day
(Clark County)

Source Type	2002 VOC	2002 NO_x	2002 CO
AREA	18,014	665	3,912
BIOGENIC	79,417	965	
NONROAD	15,374	23,222	228,078
ON-ROAD	38,315	50,495	397,983
POINT	3,572	6,089	3,803
Total	154,692	81,436	633,776







4.0 Portland-Vancouver Control Strategies

4.1 Portland-Vancouver AQMA Ozone Maintenance Plan

Both Portland-Vancouver AQMA Ozone Maintenance Plan inventories are impacted by federal, state and local emission control programs. All four major source categories of ozone precursor emissions (VOC and NO_x) are affected by control strategies that reduce emissions from these sources. Several of the strategies provide benefits beyond VOC and NO_x emission reductions, such as air toxics and greenhouse gas emission reductions, traffic congestion reduction, energy savings, and overall cost-savings for the transportation systems.

The existing Portland-Vancouver AQMA Ozone Maintenance Plan strategies in both plans will remain in place and work together to protect air quality as the population increases over the next ten years. These strategies have successfully reduced VOC and NOx emissions in the past and also should reduce emissions of air toxics and greenhouse gases that are emerging issues of concern. The “maintenance demonstration”, Section 5.0 below, includes very conservative point source estimates reflecting maximum predicted emissions. Keep mind that the maintenance demonstration is based on keeping the control strategies described below in place. The modeling demonstrates continued compliance with the standard through 2015. While the modeling shows continued compliance with the standard, it also shows peak ozone concentrations could exceed the standard threshold of 0.08 ppm in Oregon. Although an exceedence is not a violation, this illustrates the need to continue the suite of emission reduction strategies that limit ozone formation in the Portland-Vancouver area, and for appropriately managing emissions growth from new industry.

Transportation conformity rules, included as control strategies in the previous ozone plan, no longer apply to the Portland-Vancouver AQMA. Under EPA’s 2004 ozone implementation rules (40 CFR 51.900), neither general conformity nor transportation conformity applies to the AQMA since attaining the 8-hour ozone standard. This means that new transportation plans or programs no longer need to demonstrate that they conform to the ozone maintenance plans.

4.2 Vancouver Control Strategies

The control strategies in the Portland-Vancouver Ozone maintenance plans are supported by current rules that are described in Section 4.2.1 below. Some of these rules will be updated for specific programs, such as the reestablishment of the industrial sources growth allowance and are mentioned in Section 4.2.2 below. Both the strategies in the current rules and the proposed revised rules were relied upon in the maintenance demonstration. There are also other programs, such as the Commute Trip Reduction and the Public Education program that contribute to ozone precursor emission reductions, but which were not quantified nor relied upon for the maintenance demonstration. More detail on the Commute Trip Reduction program can be found in section 4.2.3.1.

4.2.1 Control Strategies Supported by Current Rules

The following strategies are fully supported by current versions of the rules and will remain in the Vancouver Ozone Maintenance Plan as they currently apply to sources in the Clark County, Washington area. SWCAA rules and their effective dates are in Appendix 7 as well as the Washington State Regulation for the Motor Vehicle Inspection program that supports the plan.

- Motor Vehicle Inspection Program (WAC 173-422, see Section 4.2.1.1 below)
- General Regulations for Air Pollution Sources (SWCAA 400)

- Air Discharge Permit Applications (Notice of Construction) (400-109) – submittal and processing of Air Discharge Permit (ADP) applications.
- New Source Review (400-110) – General requirements for ADP issuance, Best Available Control Technology (BACT) is required of all sources
- Requirements for New Sources in Nonattainment Areas (400-112) New source review for nonattainment areas
- Requirements for Replacement of Substantial Alteration of Emission Control Technology at an Existing Stationary Source (400-114) Reasonably Available Control Technology (RACT) for control equipment required
- Maintenance of Equipment (400-116) – minimum maintenance requirements
- Requirements for Nonattainment Areas (400-190) - procedural requirements for developing nonattainment provisions

- Emission Standards and Controls for Sources Emitting VOCs (SWCAA 490) – category specific requirements for gasoline loading and dispensing facilities, drycleaners, surface coater, graphic arts systems, flatwood panel manufacturers and surface finishing facilities
- Emission Standards and Controls for Sources Emitting Gasoline Vapors (SWCAA 491) – requirements for gasoline stations (includes Stage I and Stage II gasoline vapor recovery) and specific requirements for fixed roof gasoline storage tanks, gasoline loading terminals, bulk gasoline tanks and gasoline transport tanks.
- VOC Area Source Rules for reducing emissions from Consumer Products, Spray Paints, Motor Vehicle Refinishing and Area Source Common Provisions (SWCAA 493-100 through 500)

4.2.1.1 Motor Vehicle Inspection Program - Vancouver

The 1990 Amendments to the Clean Air Act continued the nonattainment status of the Portland-Vancouver Interstate Area for the 1-hour National Ambient Air Quality Standard for ozone and classified the area as marginal. The 1990 Amendments required pre-existing marginal nonattainment areas that had not yet implemented a motor vehicle inspection and maintenance (I/M) program do so. An I/M Program measures emissions from motor vehicles. If excessive levels of emissions are found, the vehicle must be repaired. While Oregon had an ongoing I/M Program in Portland, no I/M Program had been implemented in southern Clark County area until 1993.

The Washington State Plan to attain the ozone standard in southern Clark County submitted to EPA in 1992 extended the State's existing I/M Program to the Vancouver area.[4] The I/M Program became operational in southern Clark County on June 1, 1993.

The 1996 maintenance plan for southern Clark County brought changes to the boundaries for the I/M Program. The vehicle emission boundary was expanded to Brush Prairie, Battle Ground, Ridgefield and La Center Postal Zip Codes as of January 1, 1997; the testing methodology was changed to the Acceleration Simulation (ASM) mode; test standards were strengthened; testing was expanded to NO_X emissions, and a gas cap leak detection check was instituted. EPA approval of the Clark County and Portland maintenance plans allowed EPA to redesignate the Portland-Vancouver AQMA to attainment for 1-hour ozone NAAQS.

Since January 1, 2000, the I/M Program has exempted vehicles that are less than five or more than 25 years old from emissions testing.

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[4] previously the program only applied to Puget Sound and Spokane.

Vehicle emission test procedures have been modified over the years to better address real driving conditions. Since 1996, vehicles have been equipped with On Board Diagnostic Systems (OBD) that provide a comprehensive overview of the emissions control system. The I/M Program transitioned to OBD testing for newer vehicles on July 1, 2002. Even though emissions tests for NO_X had to be discontinued in 2002 to keep costs down, OBD is a more effective check for NO_X. Since 2006, gas cap checks have no longer been performed on 2000 and newer model year vehicles. OBD checks are relied on to detect evaporative emission control system leaks including gas cap leaks.

The 2015 projected inventory and the maintenance demonstration assume the current I/M program is maintained. A contract is in place for conducting I/M testing until 2012. The current I/M regulations are in Appendix 7. Ecology is submitting WAC 173-422 to EPA for approval.

4.2.2 Control Strategies with Proposed Rule Revisions

Some sections of the General Air Pollution Regulations will be updated in support of this plan. The following SWCAA 400 sections will be modified:

- Definitions (400-030) “New Source” definition amended, adds ‘emission unit’ to definition
- Sources Exempt from Registration Requirements (400-101), clarifies exemption threshold
- Requirements for New Sources in a Maintenance Plan Area (400-111) clarifies use of offsets and industrial growth allowance provisions, (see section 4.2.2.1 below)
- Requirement for New Sources in an Attainment or Nonclassifiable Areas (400-113) , clarifies allowable ambient impact level and use of growth allowance for offsets.

4.2.2.1 Requirements for New Sources in a Maintenance Plan Area

Under the existing SWCAA Rules adopted in 2005 (SWCAA 400-111), new or expanding major industrial sources located within the Vancouver portion of the AQMA must “offset” emission increases of more than 40 tons/year of VOC and NO_x by obtaining an offset from another facility. Or, the owner or operator of a proposed major source or major modification may apply to SWCAA for an allocation of the growth allowance in lieu of providing an emission offset.

The 1996 Ozone Maintenance Plans for the Portland-Vancouver areas both included an industrial emissions growth allowance for the Washington and Oregon sources that could be used by new and expanding major industry in lieu of obtaining emission offsets. Both 2006 Plans continue to use this approach to manage industrial emissions growth. The growth allowances were included in the modeled 2015 ozone maintenance demonstration.

This 2006 maintenance plan update re-establishes the growth allowance for new and expanding major VOC and NO_x industrial sources, and retains the emission offset requirement as a safeguard. SWCAA 400-111 provides both flexibility for future economic opportunity and protection of the ozone NAAQS.

Proposed sources applying for an increase in emissions of more than 40 tpy located inside the AQMA must either obtain an offset or use the available growth allowance at a rate of 1.1 to 1, for a net air quality benefit. If the new or modified source within Clark, Cowlitz or Skamania counties located outside the AQMA has caused or will cause a significant projected impact inside the AQMA as specified in SWCAA 400-113, the source must provide offsetting emission reductions to reduce the impact below the allowable ambient impact level. The source may fulfill this offsetting requirement by either obtaining an offset from another facility or by requesting an allocation of the growth allowance.

The Portland plan reestablishes the industrial growth allowance in Oregon at 5,000 tons for VOC and 5,000 tons for NOx. SWCAA adopted a growth allowance for the Vancouver AQMA (Clark Co., Washington) sources proportional to Oregon's growth allowance to ensure a level playing field on both sides of the Columbia River when promoting economic development of the region. The current growth allowance for the Vancouver AQMA as directed by the 1996 ozone plan for the years 2004-2006 is 84 tons VOC and 151 tons of NOx. The growth allowance balance for the Vancouver portion of the AQMA will be reset to 411 tons of VOC and 1,313 tons of NOx. Consumption of the growth allowance will continue to be monitored and tracked by SWCAA as described in SWCAA 400-111. As required in the existing rules, the growth allowance will be allocated on a first come first served basis. To make the growth allowance 'pool' last as long as possible, sources may provide offsets, if possible, for all or part of the proposed increase. If Oregon's growth allowance decreases to 1,000 tons or less, DEQ may increase the growth allowance by utilizing new federally enforceable emission reductions and shutdown credits that were not relied on in the maintenance demonstration. Likewise, if the SWCAA growth allowance falls below 20% of the newly reset levels, i.e., the growth allowance balance falls to or below 82 tons VOC and 263 tons NOx , SWCAA will consider increasing the growth allowance also by utilizing new federally enforceable emission reductions and shutdown credits that were not relied on in the maintenance demonstration. Any such increase to the growth allowance will be subject to public comment and EPA approval. Federally enforceable emission reductions include requirements adopted by EPA, requirements adopted by the SWCAA Board of Directors and approved by EPA as a revision to the Washington SIP and requirements established by a federally enforceable permit condition. In the event all of the growth allowance is consumed, and cannot be re-established, emission offsets for VOC and NOx will be required for new and expanding major industries. SWCAA may consider temporarily reducing the amount of growth allowance that may be allocated to new or modified major industrial sources if monitored ozone concentrations exceed the "risk of violation" or "actual violation" thresholds described in the contingency plan (Section 7.2.1). SWCAA must provide reasonable advance notice to affected industries if there is a possibility that the growth allowance could be reduced.

4.2.3 Additional Programs that Contribute to Emission Reductions

The following additional programs contribute to ozone precursor reductions, but were not relied upon in the maintenance demonstration;

- Commute Trip Reduction (CTR) program originally passed in 1991(RCW 70.94.521-551), - replaced by The CTR Efficiency Act (ESSB 6556) works with major employers in the state's most populous counties to encourage employees to commute without driving alone.
- Commute Trip Reduction Efficiency Act passed on March 29, 2006, effective July, 2007 (see Section 4.2.3.1 below).
- CTR Performance Grants - the Washington Department of Transportation oversees the Trip Reduction Performance Program that was passed by the Washington State legislature in 2003 to reduce the number of vehicle trips,
- Public education and outreach
  - Air Pollution Advisories (formerly called Clean Air Action Days) are called when weather forecasts indicate a high probability for air pollution to approach levels that are unhealthy for sensitive groups. On such days SWCAA and DEQ work with local media and industry to encourage residents to carpool or take the bus to

work and avoid burning, lawn mowing and painting to reduce their personal impact on air pollution.
  - Public presentations – SWCAA offers presentations as requested to various school and community groups, addressing local concerns about air pollution and pollution prevention. These presentations address personal impacts on air pollution, related health issues and local measures to address ozone pollution.
  - Public interaction – SWCAA frequently distributes information and brochures at community events including fire district open houses, festivals and county fairs.
  - Educational materials – SWCAA routinely distributes informational brochures to residents concerned about ozone pollution.

4.2.3.1 Changes to Commute Trip Reduction Program

The Washington Commute Trip Reduction (CTR) law passed in 1991 and covered ten counties including Clark County. The law applies to major employers (companies with over 100 employees), requires annual performance reviews, and the goals were the same for all employers. This law expired and was replaced by the CTR Efficiency Act. This new legislation passed in the 2006 legislature modifies the CTR program and will become effective on July 1, 2007. This legislation changed the program so that it will only apply to major employers in urban growth areas, changed the performance review to once every two years and provided for goals that can vary based on local and regional goals and allow companies to set goals beyond the state minimum target. Other programs that support the success of the CTR Program are Trip Reduction Performance Program, Rideshare Tax Credits, Vanpool Grant Program, Regional Mobility Grant Program and Park and Ride lots.

In 2005, the Clark County CTR program has 52 affected worksites and 12 voluntary worksites. In this same year, 18% of employees at these worksites utilized alternative transportation to work. The CTR program also offers a Guaranteed Ride Home to participating employers. The Guaranteed Ride Home program offers a free taxi ride home (up to 50 miles one way), including an intermediate stop, to employees who took an alternative ride to work and must leave work due to an unforeseen emergency (such as a sick child at school, employee illness, or unexpected mandatory overtime). Additional information about the CTR law and program can be found in Appendix 8.

Note that there is Washington participation in a number of bistate area committees whose responsibilities include establishing policies and programs to reduce regional travel demand and manage traffic operations. For example, the Regional Travel Options Subcommittee, a subcommittee of Metro’s Transportation Policy Alternatives Committee (TPAC), has Washington members from inside the AQMA. The RTOS's specific purpose is to promote alternatives to driving alone in the region.

Should elevated ozone levels or a violation occur, the impact of transportation sources as well as all other sources will be evaluated. Also, SWCAA will review emission levels from mobile sources when routinely evaluating all emission categories as required every three years by the Consolidated Emission Reporting Rule (CERR) to evaluate emission trends.

Other anticipated changes over the next ten years include:

- Low Emission Vehicles legislation will require cars sold in Washington to meet California motor vehicle emission standards beginning with the 2009 model year (WAC 173-423 ESSB 5766, adopted November 30, 2005, effective January 1, 2006) .
- Emission Standards and Controls for Sources Emitting Gasoline Vapors (WAC 173-491, SWCAA 491) Stage II vapor recovery system rules for gas stations will be modified

when the motor vehicle fleet reflects widespread use of on-board canister systems - expected to be revised prior to 2015.

The various control strategies described above work together with other elements in the maintenance plan, including the tracking of emission growth, ambient ozone monitoring and the early warning and action elements in the contingency plan, to meet air quality management goals and protect compliance with standards.

5.0 Maintenance Demonstration (Portland-Vancouver)

5.1 Ozone Modeling Study

SWCAA and DEQ teamed with WSU, the Washington Department of Ecology and EPA to study ozone formation using a computer dispersion model (see Appendix 4, "Historical and Future Ozone Simulations using the MM5/SMOKE/CMAQ System in the Portland/Vancouver Area", WSU, December 31, 2005 final report). The purpose of the study was to develop a predictive tool to forecast future ozone concentrations based on emission projections and summer meteorology in which ozone formation occurs.

The modeling study simulated two historical high ozone episodes that occurred during the summers of 1997 and 1998. The study compared actual ozone levels measured (monitored) during the 1997 and 1998 events to model predicted ozone levels for the same period in order to test and validate model performance. The model performed within EPA guidelines for both episodes. The model performance testing verifies that the CMAQ model can predict future ozone concentrations for the region (see Appendix 4 for more information on model performance testing).

The modeling team selected the July 26-28, 1998 episode as the basis for future year projections because ozone levels were much higher in 1998 than in 1997, and meteorology reflected worst case conditions that contribute to ozone formation in the Portland-Vancouver area (high temperatures and low wind speeds, with predominant winds from the north). Methodology for developing the modeling emissions data is detailed in the WSU modeling report (Appendix 4).

5.2 Growth Projections

The 2015 emissions forecast used in the modeling study reflects 2002 emissions, increased by expected growth in various sectors. The 2002 emission inventory reflects the 2002 Consolidated Emissions Reporting Rule (CERR) emissions data submitted by DEQ and SWCAA to the National Emission Inventory (NEI) and documented in Appendix 3 and 4. Growth factors for various source sectors were derived from the 2002 "Economic Report to the Metro Council, 2000-2030 Regional Forecast for the Portland-Vancouver, Metropolitan Area" (Metro Report) (see Appendix 5).

For the 2015 Maintenance Projection, the following growth assumptions were included in the forecast:

Area sources: Area source emissions were calculated following EPA guidance for the 2002 NEI. Table 6 describes population trends in the Portland and Vancouver areas. The 2015 emissions inventory assumes a linear, non-compounding population growth rate of 1.8% per year, and household growth rate of 2.0% per year from the Metro Report. The area source emission inventory was adjusted to reflect summertime conditions when used in the modeling analysis and maintenance demonstration.

Table 6: Portland Vancouver Area Population Projections

	2000 Estimate	2005 Forecast	2010 Forecast	2015 Forecast
Portland-Vancouver Area* (Clackamas, Multnomah, Washington and Clark Counties)	1,789,460	1,956,300	2,134,300	2,287,000
Vancouver Area (Clark County)**	345,238	391,264	432,479	473,674

*"Economic Report to the Metro Council, 2002-2030 Regional Forecast," page 4
** Projections of the Total Resident Population for the Growth Management Act, Intermediate: Year After 2010 Clark 2000 TO 2025 by Single County, Office of Financial Management, released January 2002

<u>Non-road mobile sources:</u> EPA's draft NONROAD2004 model was used to estimate nonroad source emissions for 2015. This model incorporates the latest assumptions and rules, including EPA's Tier 4 non-road diesel engine standards and non-road diesel fuel sulfur standards associated with the Tier 4 rule. Railroads, marine vessels and airports were estimated independently of the NONROAD model (see Appendix 4). Aircraft emissions for the four airports with the Portland AQMA were calculated using Port of Portland data (Aviation Demand Forecast Update for Portland International Airport, Port of Portland, November 4, 1999, and associated spreadsheets), which was also used in the 2002 NEI submittal.

On-road mobile sources: 2015 on road vehicle miles traveled estimates used in the modeling analysis are based on travel demand forecast models run by Metro and the Southwest Regional Transportation Council (RTC) for the Portland-Vancouver AQMA, and Department of Transportation data and projections for the modeling domain. RTC's last regional analysis completed in December 2004, predicted that even with high population, employment and VMT growth, hydrocarbon levels are expected to drop significantly between 2004 and 2025. Also, the projected emissions values for on road sources in the maintenance demonstration are consistent with RTC's analysis. EPA's MOBILE6.2 model was used to estimate emission rates per vehicle mile traveled for 2015. MOBILE6.2 incorporates federal motor vehicle and fuel standards expected in 2015, and allows incorporation of local data for many of the necessary parameters such as fleet and fuel characteristics, and I/M programs. The 2015 maintenance demonstration also shows reductions in emissions from these sources with the existing Inspection and Maintenance program control strategies in place. Expected changes in federal regulations include two classes of Heavy Duty gas vehicles that will be OBD tested starting in 2008. In Oregon, the modeling projections included the change in their Vehicle Inspection Program rules to replace the "enhanced" vehicle inspection test with the "basic" vehicle inspection test for vehicle model years 1981-1995. This change is reflected in the modeling projections and maintenance demonstration of this plan. Although there are some changes to Washington's I/M program, i.e., starting with model year 2009, cars will be required to meet California emission standards, the modeling projections did not include any changes for the Washington I/M program.

<u>Point sources</u>: SWCAA and DEQ developed two different growth scenarios for major industrial (point) sources, and their purpose is discussed in more detail below. The two scenarios include:

- 2015 Projection: reflecting actual 2002 emissions from existing industry, increased by expected employment projections in the Metro report.

- 2015 Maintenance Demonstration: reflecting a conservative approach using estimates of maximum permitted levels for existing industry and new industry growth allowance.

5.3 Forecast and Maintenance Inventory

As noted above, DEQ and SWCAA developed two different growth scenarios for major industrial (point) sources, and they are used for different purposes. The first growth scenario (called "2015 Projection" as seen in Figures 4 and 5) reflects the 2002 estimate of actual industrial emissions, increased by expected regional employment projections for that sector. This projection represents a baseline estimate of actual future year emissions, given expected growth, and is included in the WSU modeling report as the managed growth simulation projection (Appendix 4).

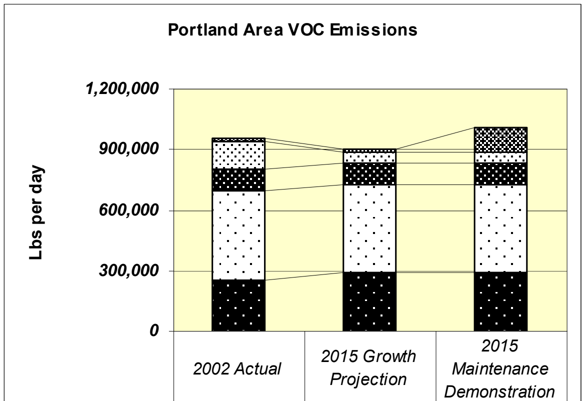
The second growth scenario (called "2015 Maintenance Demonstration" also seen in Figures 4 and 5) represents a very conservative approach using maximum estimates of possible future year emissions. The 2015 Maintenance Demonstration reflects maximum "legally allowable" emission levels currently permitted for existing industry, plus the emissions growth allowance re-established for new industry growth. Because Oregon's permitting program differs from SWCAA's, there is a substantial difference between Oregon Plant Site Emission Limits (PSEL) and Washington sources' Potential to Emit (PTE). Since PSELs and PTEs are not similar, Washington point source emissions were adjusted for the purposes of this maintenance demonstration to provide a more equal comparison. Using the ratio of Oregon 'allowable' emissions to Oregon's 2002 actual emissions for each pollutant, Washington point sources were increased by this same ratio. Then, a proportional growth allowance was added to this value. This 2015 Maintenance Demonstration represents the most conservative estimate of possible future industrial emissions for purposes of the maintenance plan.

Tables 7 and 8 and Figures 4 and 5 below show the 2002 estimate of actual emissions and the conservative growth scenario "2015 Maintenance Demonstration" described above. Figures 4 and 5 also show the intermediate 2015 Projection described in the WSU modeling report.

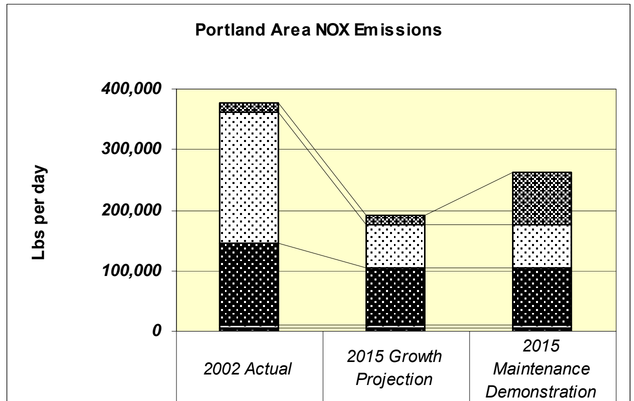
Both VOC and NO_x emissions are involved in the formation of ozone and the relative amounts of each (VOC/NO_x ratio) can influence the level of ozone formation. The WSU modeling analysis shows that of the two pollutants, VOC is the primary driver of ozone formation in the urban Portland area. However, both VOC and NO_x emission reduction strategies continue to be important to reducing ozone formation.

Figure 4 below shows graphically the 2002 estimate of actual VOC and NOx emissions, the intermediate 2015 Growth Projection, and the 2015 Maintenance Demonstration for the Portland area. In 2002, major industry accounted for about 2% of total VOC emissions in the Portland area. Under the 2015 Maintenance Demonstration, major industry would account for about 12% of total VOC in the Portland area, and the majority of VOC emissions (approximately 30% annually) would come from the area source sector.

Figure 4: Portland-Area VOC and NOx Emissions (lb/day) and 2015 Growth Projection and Maintenance Demonstration



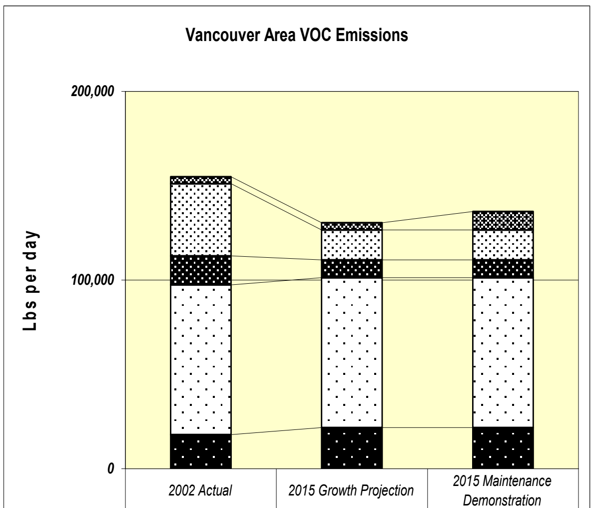
	2002 Actual	2015 Growth Projection	2015 Maintenance Demonstration
POINT	17,020	18,304	119,943
ON-ROAD	139,542	54,521	54,521
NONROAD	110,188	101,699	101,699
BIOGENIC	437,910	437,910	437,910
AREA	253,871	291,098	291,098



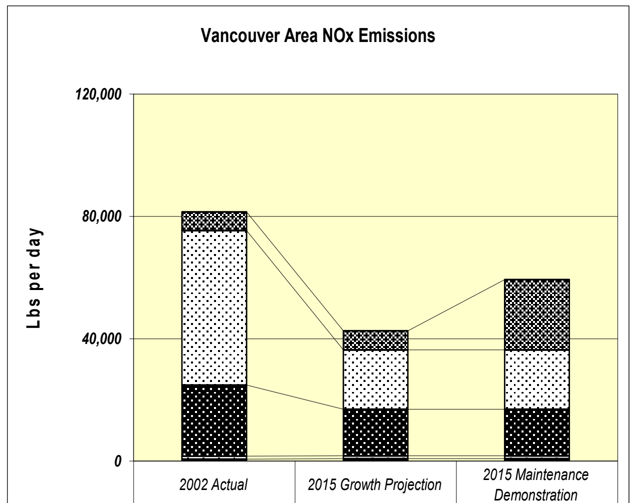
	2002 Actual	2015 Growth Projection	2015 Maintenance Demonstration
POINT	14,913	16,783	86,780
ON-ROAD	216,750	68,910	68,910
NONROAD	136,713	95,638	95,638
BIOGENIC	3,890	3,890	3,890
AREA	5,529	6,157	6,157

Figure 5 shows expected growth in VOC and NOx emissions for the Vancouver area, including allowable emissions for existing industry. The industrial growth allowance has been established for the Vancouver area in proportion to Oregon industrial sources. Future growth in that area is expected to be accommodated through the New Source Review process. Including maximum allowable emissions in these projections for existing industry, the major industry sector would account for approximately 7% of the total Vancouver area VOC emissions and 39% of the NOx emissions in the maintenance demonstration. On road vehicle emissions represented 25% of VOC emissions in 2002 and are expected to be 12% of the total VOC emissions in 2015. While on-road sources were a larger percentage of ozone precursors in 2002, growth projections show area sources will contribute significantly to VOC emissions in 2015. Nonroad sources are projected to be the largest emission category for NOx in 2015 growth projections.

Figure 5: Vancouver VOC and NOx Emissions (lb/day) and 2015 Growth Projection and Maintenance Demonstration



	2002 Actual	2015 Growth Projection	2015 Maintenance Demonstration
POINT	3,572	3,780	9,682
ON-ROAD	38,315	16,026	16,026
NONROAD	15,374	9,339	9,339
BIOGENIC	79,417	79,417	79,417
AREA	18,014	21,860	21,860



	2002 Actual	2015 Growth Projection	2015 Maintenance Demonstration
POINT	6,089	6,197	22,965
ON-ROAD	50,495	19,482	19,482
NONROAD	23,222	15,183	15,183
BIOGENIC	965	965	965
AREA	665	786	786

Table 7
Portland Area 2015 Maintenance Demonstration
Typical Summer Day, lb/day
Clackamas, Multnomah, Washington Counties

Source Type	2015 VOC	2015 NO_x	2015 CO
AREA	291,098	6,157	29,373
BIOGENIC	437,910	3,890	--
NON-ROAD	101,699	95,638	2,260,810
ON-ROAD	54,521	68,910	560,955
POINT	119,943	86,780	108,526
Total	1,005,171	261,375	2,959,664

Portland Area VOC and NO_x Emissions, (lb/day), % Change 2002-2015
(Clackamas, Multnomah, Washington Counties)

Source Type	--- VOC, lbs per day --- 2002 Actual	2015 Maintenance Demonstration	% Change	Source Type	--- NOX, lbs per day --- 2002 Actual	2015 Maintenance Demonstration	% Change
AREA	253,871	291,098	14.7%	AREA	5,529	6,157	11.4%
BIOGENIC	437,910	437,910		BIOGENIC	3,890	3,890	
NONROAD	110,188	101,699	-7.7%	NONROAD	136,713	95,638	-30.0%
ON-ROAD	139,542	54,521	-60.9%	ON-ROAD	216,750	68,910	-68.2%
POINT	17,020	119,943	604.7%	POINT	14,913	86,780	481.9%
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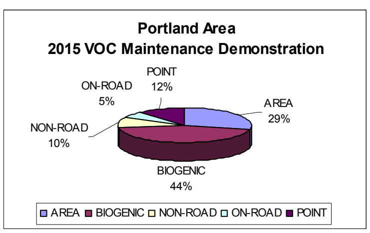
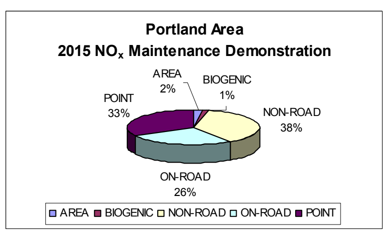
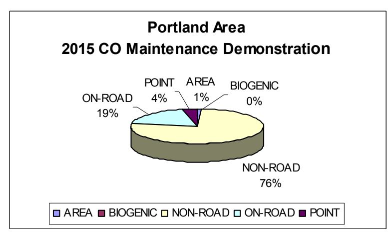
Totals	958,531	1,005,171		Totals	377,794	261,375	





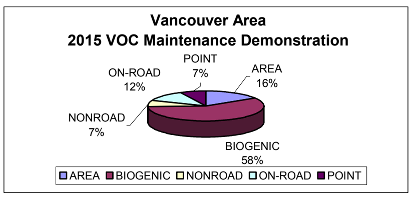


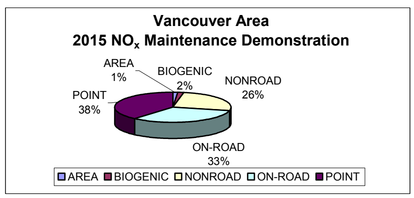
The Portland area on-road emissions are expected to decrease significantly: 61% less VOC emissions and 68% less NO_x emissions. This is primarily due to implementation of federal motor vehicle emission and fuel standards and continuing implementation of the vehicle inspection program. Non-road emissions also show a 30% decrease in NO_x emissions due to the phase-in of federal emission and fuel standards. Point source “actual” emissions are not expected to change significantly, although Figure 4 shows the difference between “actual” emissions in the 2002 attainment inventory and the “allowable” emissions and growth allowance in the 2015 Maintenance Demonstration.

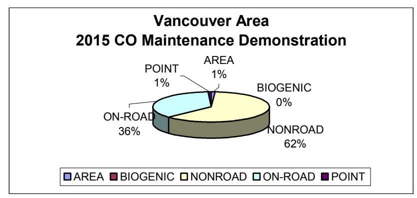
Table 8: Vancouver Area 2015 Maintenance Demonstration, Typical Summer Day, lb/day Clark County

Vancouver Area 2015 Maintenance Demonstration
Typical Summer Day, lb/day
Clark County

Source Type	2015 VOC	2015 NO_x	2015 CO
AREA	21,860	786	5,337
BIOGENIC	79,417	965	0
NONROAD	9,339	15,183	271,651
ON-ROAD	16,026	19,482	159,167
POINT	9,682	22,965	3,780
Total	136,323	59,381	439,935







Vancouver Area VOC and NOx Emissions (lb/day), % Change 2002-2015 (Clark County)

--- VOC, lbs per day ---				--- NO_X, lbs per day ---			
Source Type	2002 Actual	2015 Maintenance Demonstration	% Change	Source Type	2002 Actual	2015 Maintenance Demonstration	% Change
AREA	18,014	21,860	21.3%	AREA	665	786	18.2%
BIOGENIC	79,417	79,417		BIOGENIC	965	965	
NONROAD	15,374	9,339	-39.3%	NONROAD	23,222	15,183	-34.6%
ON-ROAD	38,315	16,026	-58.2%	ON-ROAD	50,495	19,482	-61.4%
POINT	3,572	9,682	171.0%	POINT	6,089	22,965	277.2%
	----------	----------			----------	----------	
	154,692	136,323			81,436	59,381	

The Vancouver area on-road emissions are also expected to decrease significantly: 58% less VOC emissions and 61% less NO_x emissions. This is primarily due to implementation of federal motor vehicle emission and fuel standards and continuing implementation of the vehicle inspection program. Non-road emissions also show an approximate 35% decrease in NO_x and 39% reduction in VOC emissions due to the phase-in of federal emission and fuel standards. The eventual shift from Stage II vapor recovery at gas stations to on-board canisters in cars is reflected in the 2015 modeling projections and maintenance demonstration of this plan. Point source “actual” emissions are not expected to change significantly. Figure 5 shows the “actual” emissions in the 2002 attainment inventory, the 2015 growth projection and the “allowable” emissions with the growth allowance used in the 2015 Maintenance Demonstration.

5.4 Maintenance Demonstration – Ozone Level Projections

The WSU Ozone Modeling study (December 2005 report, Appendix 4) used the 2015 maintenance demonstration values and worst-case meteorology from the 1998 high ozone event in the CMAQ model to estimate future ozone concentrations for the Portland and Vancouver areas in 2015. Compliance with the 8-hour ozone NAAQS is demonstrated when the fourth highest daily maximum 8-hour average ozone concentration, averaged over three consecutive years (i.e., Design Value), is equal to or less than 0.08 ppm[5].

Table 9 shows the 2015 predicted Design Value, which is used to compare to the ozone standard for purposes of determining compliance. The WSU modeling analysis also confirms that the existing monitoring network is capturing the areas of highest ozone concentrations. This modeling analysis also estimates that potential projected maximums could exceed the ozone standard. The largest predicted maximum potentially could be at the Milwaukie site in Portland; the estimated result is 0.096 ppm, an exceedance of the standard of 0.08 ppm.

Table 9: 2015 Maintenance Demonstration (ozone values)
8-hour ozone standard = 0.08 ppm
Exceedance ≥ 0.085 ppm maximum
Violation ≥0.085 ppm Predicted Design Value

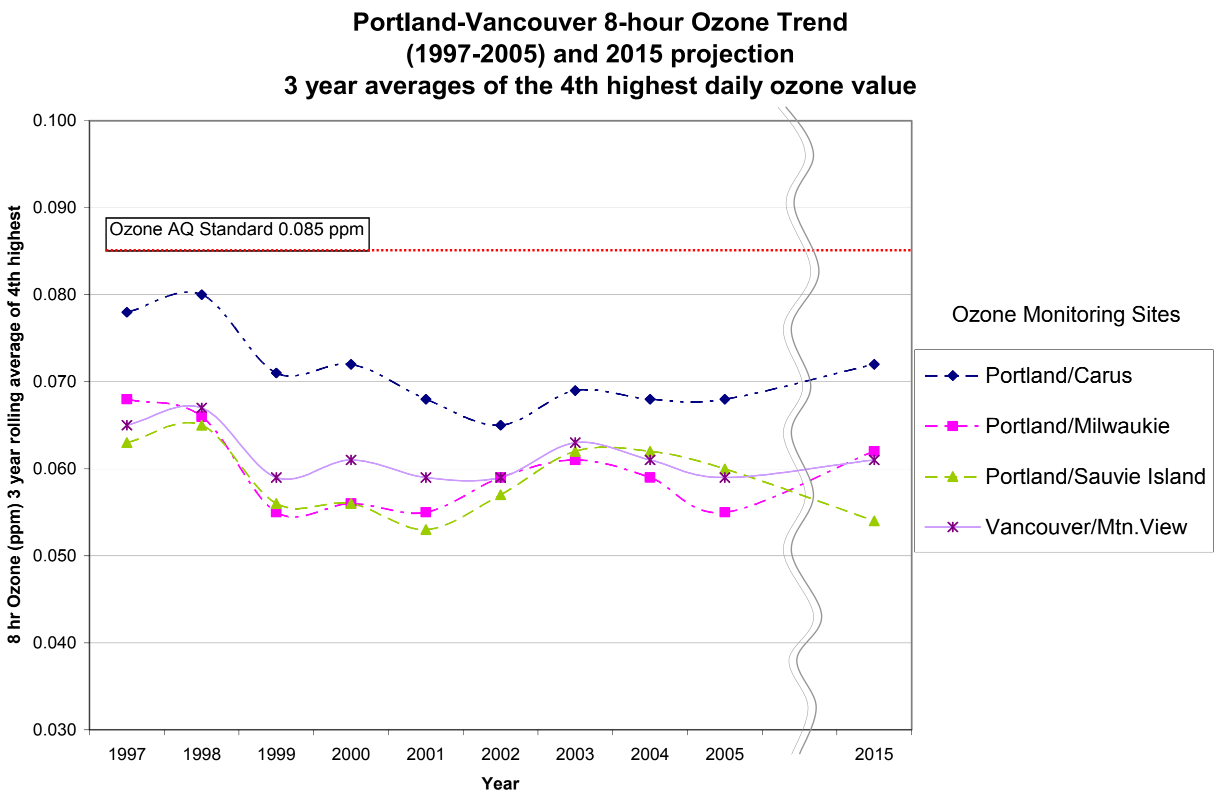
Monitoring Site	1998 Current Design Value, ppm	Relative Reduction Factor	2015 Predicted Design Value*, ppm
Portland/Carus	0.075	0.955	0.072
Portland/Milwaukie	0.059	1.046	0.062
Portland/Sauvie Island	0.059	0.923	0.054
Vancouver/Mountain View	**0.063**	**0.975**	**0.061**

*Predicted Design Value is calculated using the EPA statistical procedure called the Relative Reduction Factor described in Appendix 6 and EPA 8-hour ozone modeling guidance. Predicted design value is compared to the 8-hour ozone standard to determine compliance.

Figure 6 shows the ozone compliance trend for the Portland-Vancouver area, including the 2015 maintenance projection. The values shown in Figure 6 and Table 9 demonstrate that the Portland-Vancouver area will remain in compliance with the 8-hour ozone standard, that is, there will be no design value over 0.08 ppm. However, the modeling results show that the standard may be exceeded, i.e., peak ozone concentrations may exceed 0.085 ppm, illustrating the need to continue the suite of emission reduction strategies that limit ozone formation in the Portland-Vancouver area, and for appropriately managing emissions growth from new industry.

[5] Under EPA's calculation convention, a value of 0.084 ppm would round down to 0.08 ppm (i.e. in compliance), while a value of 0.085 ppm or higher would be a violation.

Figure 6: Portland-Vancouver Ozone Maintenance Demonstration



Again, Figure 6 and Table 9 illustrate that the Portland-Vancouver AQMA will maintain compliance with the 8-hour ozone standard through 2015. The Carus monitoring site, downwind of Portland, has historically been the site with the highest ozone readings in the region. The model predicted that the Milwaukie site would produce a slightly higher maximum value under meteorological conditions similar to the 1998 episode, and the maximum values at both Milwaukie and Carus would exceed but not violate the standard. However, the Carus site is expected to remain the highest and most important site for determining compliance with the ozone standard. The 4^{th} high design values at Carus and all other sites demonstrate continued compliance with the ozone NAAQS.

6.0 Air Quality Monitoring (Portland-Vancouver)

SWCAA and DEQ will continue to operate an ozone air quality monitoring network in accordance with 40 CFR 58 to verify maintenance of the 8-hour ozone standard in Portland and Vancouver (see Appendix 1). Any modification to the ambient air monitoring network, such as removal of duplicative or unnecessary monitors, will be accomplished through close consultation with EPA Region 10. Proposed network modifications would be accompanied by technical and statistical analysis sufficient to document a given monitor may be removed because it is unnecessary or duplicative in the case of network reductions, or to justify the value of investing in monitoring network enhancements. In accordance with 40CFR 58, the final network design will be subject to the approval of the EPA Regional Administrator.

7.0 Contingency Plan

The maintenance plan must include a process to quickly prevent or correct any measured violation of the 8-hour ozone standard. This process of investigation and (if needed) corrective action is called the "contingency plan". Contingency plans typically have several stages of action depending on the severity of monitored ozone levels. Ambient ozone thresholds are established in the contingency plan as early-warning action levels. If monitored ozone levels exceed these action levels, the contingency provisions are triggered. Portland has contingency plan measures based on VMT/capita whereas Vancouver's contingency measures focus on performing evaluations to determine the root cause of the air pollution levels which triggered the contingency plan.

7.1 Request to Replace the Portland-Vancouver AQMA 1-Hour Contingency Plan with an 8-Hour Contingency Plan

EPA revoked the one-hour ozone standard, effective June 15, 2005 (69 FR 23951, April 30, 2004). In accordance with EPA rules implementing the 8-hour ozone standard (40 CFR 51.900), SWCAA requests that the one-hour ozone contingency plan be removed from the Portland-Vancouver AQMA Ozone Maintenance Plan, and replaced with a contingency plan that addresses the 8-hour ozone standard as described below.

7.2 Portland-Vancouver AQMA 8-hour Ozone Contingency Plan

The Portland contingency plan includes two sets of contingency measures. The provisions specified under Part A of the Contingency Plan for the Portland-Vancouver AQMA are linked to ambient concentrations of ozone and would be triggered if measured ozone levels at any of the ozone monitoring sites (Mountain View, Sauvie Island, Milwaukie, or Carus) exceed the early-warning thresholds below, or if a violation of the 8-hour ozone standard occurs. The provisions specified under Part B of the Portland Contingency Plan are linked to increases in the average amount of vehicle use per person (VMT/capita) in the Portland metropolitan area, and would only affect the Oregon portion of the Portland-Vancouver AQMA. EPA's 8-hour ozone implementation rule (69FR pages 23987-88, April 30, 2004) notes that although states cannot implement conformity for attainment areas as a matter of federal law, they could still work with their metropolitan planning organizations to develop a voluntary program to address motor vehicle emissions growth. The Portland plan Contingency Plan Part B includes actions that trigger based on increases in %VMT increases in two phases. Oregon's Transportation Planning rule requires DEQ to track VMT/Capita growth. Washington does not have this legislation. Because of this difference, the Vancouver contingency plan measures will not be the same as Portland's Plan B contingency measures. SWCAA and DEQ will both focus on the evaluations for establishing the root cause of the contingency plan triggering emission levels.

7.2.1 Part A, Contingency Plan Based On Ambient Concentrations in Portland or Vancouver

PHASE 1: ELEVATED OZONE LEVELS
If the air quality index (AQI) is forecast to be within the "orange" range for ozone air quality (unhealthy for sensitive populations), or 8-hour daily maximum ozone values approach 0.100 ppm or greater, and meteorological conditions conducive to ozone formation are expected to persist, SWCAA and DEQ will coordinate to issue an advisory to inform the public of air quality levels and voluntary actions they can take to limit exposure to unhealthy air pollution levels and reduce emissions.

PHASE 2: RISK OF VIOLATION
If monitored 8-hour ozone levels at any site within the Portland-Vancouver area registers an annual fourth highest monitored value of 0.085 ppm or greater within a single ozone season or 0.080 ppm or greater averaged over two years, SWCAA and DEQ will assess the likely sources of emissions and meteorological events contributing to elevated ozone levels. DEQ and SWCAA may form an advisory group to assist in its review.

SWCAA or DEQ could recommend that no action be taken if it is determined that: (a) elevated ozone levels were caused by an event that is unlikely to occur again, or (b) high ozone levels were caused by an uncontrollable event, such as a severe wildfire, or (c) federal regulations that will reduce ozone precursor emissions are scheduled to be implemented within two years. If it is determined that the event did not meet the criteria above, SWCAA and DEQ will evaluate options for appropriate action, including the option for additional emission reduction strategies to prevent future exceedances or a violation of the 8-hour ozone standard. An assessment by SWCAA at the "risk of violation" level would include a review of emissions to identify the source category that contributes the most emissions to the airshed. However, the emission source category with the largest contribution may not be the category that can provide the greatest emission reductions at the least cost. SWCAA would review each of the source categories to evaluate the best overall reduction potential. Based on this analysis, measures that would be considered for implementation of each emission source category include the following:

1. Mobile Sources
    - Evaluate options for maintaining the I/M program beyond the current I/M contract expiration in 2012.
    - Consult with RTC to review and evaluate possible transportation control measures.
2. Point Sources
    - consider instituting LAER or eliminating the growth allowance for new or modified sources.
3. Area Sources
    - Conduct a top-ten analysis to identify the activities associated with the largest contributors to area source emissions and consider alternatives to achieve reductions in emissions from these activities, (e.g., consider other surface coating regulations, curtailment of certain kinds of painting on hot summer days, etc.).
4. Nonroad sources
    - Evaluate emission reduction opportunities for these categories (e.g., reducing idling from locomotives, rebates for old lawn mowers, etc.).

PHASE 3: ACTUAL VIOLATION
If a violation of the 8-hour ozone standard occurs, SWCAA and DEQ will determine the emissions and meteorological events contributing to the violation. If the violation is not due to an event unlikely to occur again, an uncontrollable event or other criteria in Phase 2, SWCAA and DEQ will identify new strategies necessary to ensure compliance with the 8-hour ozone standard within 18 months of the conclusion of the ozone season that prompted the contingency plan, and revise the maintenance plan as needed to correct the violation. A revised maintenance plan would be submitted to EPA for approval.

Should an actual violation occur, SWCAA would pursue the measures identified in Phase 2 and convene a community advisory group to choose control measures to achieve the necessary emission reductions.

8.0 Verification of Continued Attainment (Portland-Vancouver)

SWCAA and DEQ will continue to monitor ambient air quality ozone levels in the Portland-Vancouver AQMA during the ozone season (May through September) using the ozone monitoring network as described in Appendix 1. DEQ and SWCAA will update countywide emission inventories every three years as required by the Consolidated Emission and Reporting Rule (CERR) to update the National Emissions Inventory. If ambient ozone levels increase, DEQ and SWCAA will compare CERR updates with the 2002 and 2015 emissions inventories and evaluate the assumptions used in the 2015 emissions projections to determine whether emissions are increasing at a rate not anticipated in the maintenance plan.

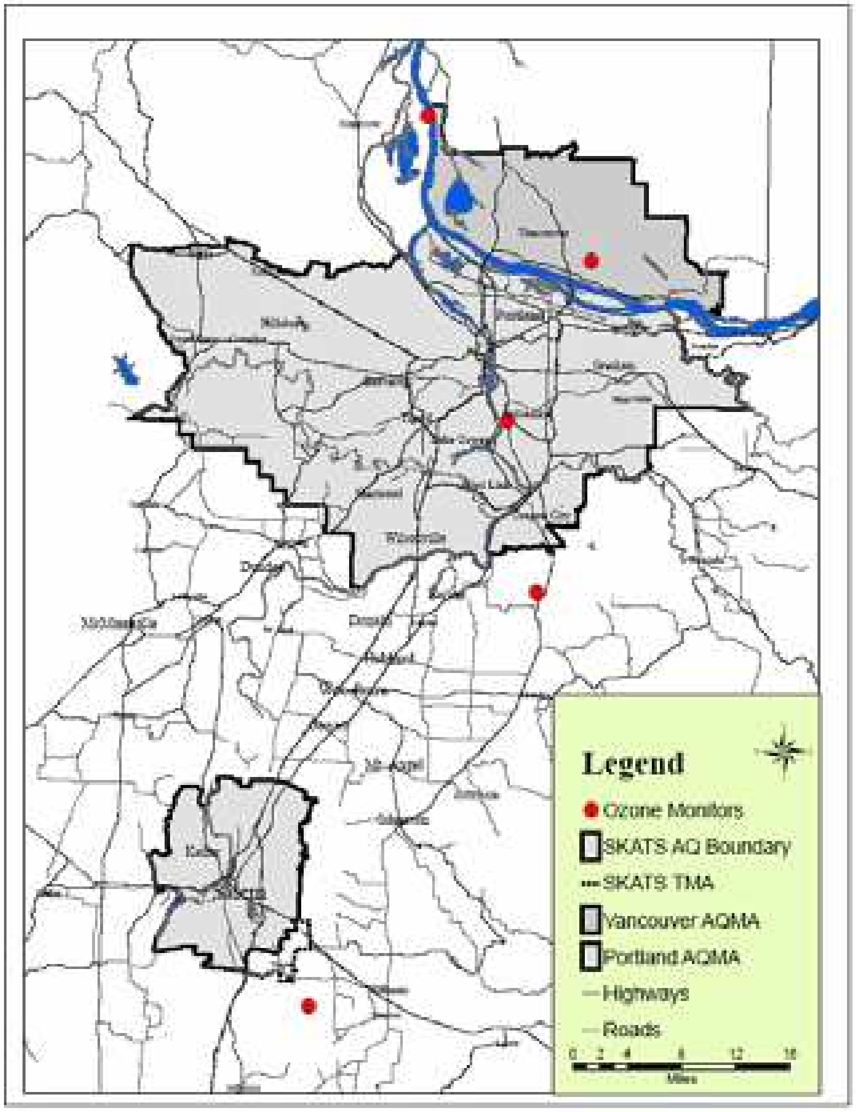
Appendices

1. AQMA Ozone Monitoring Network (Vancouver-Portland-Salem regional area map and site description)
2. 1992 to 2005 Meteorological Factors Conducive to Ozone Formation in the Portland-Vancouver Area (ODEQ, April 2006)
3. Emission Inventory
    a. Annual Emission Inventory
    b. Typical Summer Day Emissions Inventory
    c. Summary of Vancouver Area Emissions
    d. Summary of Portland Area Emissions
4. Modeling and Maintenance Demonstration - Historical and Future Ozone Simulations Using the MM5/SMOKE/CMAQ System in the Portland-Vancouver Area (WSU, December 31, 2005).
5. Economic Report to the Metro Council, 2000-2030 Regional Forecast for the Portland-Vancouver Metropolitan Area (Metro's Data Resource Center, December 2002 final draft)
6. Modeled Attainment Test (detailed spreadsheet).
7. Vancouver Area Control Strategies – SWCAA and Washington State Regulations
8. Other Emission Reduction Programs Information
9. Map and Description of Vancouver AQMA

References

- "Maintenance Plan Guidance Document for Certain 8-hour Ozone Areas Under Section 110(a)(1) of the Clean Air Act" (memo dated May 20, 2005 from Lydia Wegman, EPA). The May 20, 2005 guidance applies to areas designated in attainment with the 8-hour ozone standard and preparing maintenance plans under Section 110(a)(1) of the Clean Air Act and 40 CFR 51.905(c) and (d).
- "Demonstrating Noninterference Under Section 110(l) of the Clean Air Act When Revising a State Implementation Plan" (draft EPA Guidance, 6/8/05)
- "1-Hour Ozone Maintenance Plans Containing Basic I/M Programs (memo dated May 12, 2004 from Tom Helms, EPA)
- April 30, 2004 Federal Register (69FR 23951), Final Rule to Implement the 8-Hour Ozone NAAQS-Phase 1
- July 8, 2005 Federal Register (70FR 39413), Notice of Final Rulemaking regarding Nonattainment Major New Source Review Implementation under 8-Hour Ozone NAAQS
- "Guidance on the Use of Models and Other Analyses in Attainment Demonstrations for the 8-hour Ozone NAAQS" (EPA-450/R-05-002, October, 2005)
- "Emission Inventory Guidance for Implementation of Ozone and Particulate Matter NAAQS and Regional Haze" (EPA-454/R-05-001, August 2005, updated November 2005)
- "2002 Base Year Emission Inventory SIP Planning: 8-hr Ozone, PM 2.5 and Regional Haze Programs" (memo dated November 18, 2002 from Lydia Wegman, EPA)
- "Procedures for Processing Requests to Redesignate Areas to Attainment" (memo dated September 4, 1992 from John Calcagni, EPA)

Appendix 1
Portland-Vancouver AQMA
Ozone Monitoring Network



Monitoring Sites (north to south):

1. Sauvie Island (Portland, OR) (background site)
2. Mountain View (Vancouver, WA)
3. Milwaukie (Portland, OR)
4. Carus (Portland, OR) (traditionally highest ozone values)
5. Turner (Salem, OR) (not included in the Portland-Vancouver AQMA)

The Portland-Vancouver AQMA Monitoring Network

The Portland/Vancouver area has four ozone monitoring sites shown in the map above. (The map also shows the Salem, Oregon site which is not a part of the Portland-Vancouver AQMA. One site is located at Mountain View High School in Vancouver, Washington. The other three sites are located in the Portland area at the following locations: Sauvie Island, Milwaukie High School, and Carus (Spangler Road).

The Portland area monitors have been in operation since the mid-1970's. The current Vancouver site has only been in operation since 1988. Prior to this date, there was an ozone monitor located at the Columbia River High School in Vancouver from 1979 to 1987.

The ozone monitoring season ran from April through October until 1999. In 1999, the ozone season was changed to run from May through September instead. Since then, the monitors have run continuously May through September, with hourly averages derived electronically via data loggers and integrators. After rigorous quality assurance, the data is input into the Air Quality System (AQS), which supplies EPA with the air quality monitoring data. This data provides the basis for Portland/Vancouver's air quality status.

SWCAA and DEQ Continuous Air Monitoring Method for Ozone

The method used by the monitor to measure ozone is Ultraviolet Photometry. The air sample enters a chamber with an ultraviolet lamp at one end and detector at the other. The ozone in the sample stream absorbs the ultraviolet light at a specific wavelength. The amount absorbed is proportional to the amount of ozone in the air stream. The detector then sends an amplified signal to the recorder. This is an EPA Federal Reference Method.

The Portland Area data is 8-hour Ozone Air Quality Data from DEQ Air Quality Annual Report, 2004.The Vancouver data is from SWCAA Air Quality Annual Report, 2004.

STATION LOCATION AND NUMBER	Year	SUMMER AVERAGE	1-HOUR MAXIMUM (date)	# OF DAYS >0.125 ppm	8-HOUR AVERAGE MAXIMUM	4TH HIGHEST 8-HOUR AVERAGE	# OF DAYS >0.085 ppm	3 YEAR AVG OF 4TH HIGH
Portland Area	1994	0.029	0.117 (07/21)	0	0.084 (07/21)	0.078 (07/27)	2	0.079†
Carus (SPR)	1995	0.027	0.099 (06/30)	0	0.084 (09/01)	0.073 (09/14)	1	0.072†
13575 Spangler Road	1996	0.029	0.149 (07/26)	1	0.112 (07/26)	0.099 (07/27)	7	0.083†
Canby	1997	0.025	0.085 (07/04)	0†	0.074 (07/04)	0.062 (05/13)	0	0.078
DEQ# 10093 EPA# 410050004	1998	0.026	0.137 (07/28)	3†	0.116 (07/26)	0.081 (09/01)	3	0.080
	1999	0.028	0.102 (07/10)	0†	0.080 (07/09)	0.072 (07/28)	0	0.071
	2000	0.025	0.086 (06/28)	0†	0.071 (06/03)	0.065 (07/30)	0	0.072
	2001	0.025	0.099 (08/09)	0†	0.080 (08/09)	0.069 (06/20)	0	0.068
	2002	0.025	0.101 (07/22)	0†	0.085 (07/10)	0.063 (07/21)	1	0.065
	2003	0.029	0.097 (07/29)	0†	0.084 (09/03)	0.075 (07/28)	0	0.069
	2004	0.025	0.105 (07/24)	0†	0.084 (07/24)	0.067 (08/11)	0	0.068
	2005	0.025	0.093 (08/04)	0†	0.079	0.064 (07/27)	0	0.069

STATION LOCATION AND NUMBER	Year	SUMMER AVERAGE	1-HOUR MAXIMUM (date)	# OF DAYS >0.125 ppm	8-HOUR AVERAGE MAXIMUM	4TH HIGHEST 8-HOUR AVERAGE	# OF DAYS >0.085 ppm	3 YEAR AVG OF 4TH HIGH
Milwaukie High Sch (MHS)	1994	0.018	0.103 (07/20)	0	0.087 (07/20)	0.057 (07/21)	1	0.060†
11300 SE 23rd	1995	0.018	0.110 (07/18)	0	0.092 (07/18)	0.067 (05/29)	1	0.059†
DEQ# 10095 EPA# 410052001	1996	0.019	0.145 (07/14)	2	0.120 (07/14)	0.085 (07/13)	4	0.069†
	1997	0.016	0.101 (07/20)	0	0.082 (07/04)	0.054 (07/19)	0	0.068†
	1998	0.018	0.124 (07/26)	0†	0.100 (07/26)	0.061 (08/31)	1	0.066†
	1999	0.015	0.080 (06/14)	0†	0.054 (07/09)	0.051 (05/23)	0	0.055†
Milwaukie (MSJ)	2000	0.018	0.085 (06/04)	0†	0.068 (06/04)	0.056 (08/23)	0	0.056
St. Johns Church	2001	0.018	0.082 (08/10)	0†	0.066 (08/10)	0.059 (08/12)	0	0.055
DEQ# 23306 EPA# 410052002	2002	0.020	0.116 (07/22)	0†	0.082 (07/22)	0.063 (08/13)	0	0.059
	2003	0.021	0.091 (06/07)	0†	0.068 (06/06)	0.061 (07/28)	0	0.061
	2004	0.017	0.094 (07/24)	0†	0.077 (07/24)	0.054 (08/15)	0	0.059
	2005	0.016	0.083 (05/27)	0†	0.063 (05/27)	0.05 (8/14)	0	0.055

Sauvie Island (SIS)	1994	0.023	0.102 (07/20)	0	0.086 (07/20)	0.062 (07/21)	1	0.066†
Social Security Beach	1995	0.022	0.103 (07/18)	0	0.089 (07/18)	0.061 (07/17)	1	0.063†
DEQ# 14152 EPA# 410090004	1996	0.026	0.096 (08/10)	0	0.084 (07/13)	0.076 (07/26)	0	0.066†
	1997	0.022	0.081 (07/04)	0†	0.064 (07/04)	0.053 (05/11)	0	0.063
	1998	0.023	0.093 (07/26)	0†	0.077 (07/27)	0.066 (08/28)	0	0.065
	1999	0.021	0.070 (07/09)	0†	0.056 (07/09)	0.049 (09/22)	0	0.056
	2000	0.022	0.080 (06/04)	0†	0.066 (06/27)	0.054 (06/03)	0	0.056
	2001	0.025	0.089 (08/10)	0†	0.068 (08/10)	0.056 (05/10)	0	0.053
	2002	0.025	0.084 (07/10)	0†	0.067 (08/13)	0.061 (06/12)	0	0.057
	2003	0.025	0.088 (09/03)	0†	0.073 (09/03)	0.069 (07/28)	0	0.062
	2004	0.023	0.074 (07/24)	0†	0.061 (07/23)	0.058 (07/22)	0	0.062
	2005	0.023	0.08 (08/04)	0†	0.064 (08/04)	0.055 (08/14)	0	0.061

STATION LOCATION AND NUMBER	Year	SUMMER AVERAGE	1-HOUR MAXIMUM (date)	# OF DAYS >0.125 ppm	8-HOUR AVERAGE MAXIMUM	4TH HIGHEST 8-HOUR AVERAGE	# OF DAYS >0.085 ppm	3 YEAR AVG OF 4TH HIGH
Vancouver Area	1995	0.021	0.117 (7/19)	0	n/a	n/a	0	n/a
Mountain View High School	1996	0.022	0.112 (07/19)	0	n/a	n/a	0	n/a
1500 SE Blairmont Dr.	1997	0.02	0.077 (07/04)	0	n/a	n/a	0	n/a
Vancouver	1998	0.021	0.102 (07/28)	0	0.078 (07/27)	0.07 (08/28)	0	n/a
AIRS #530110011	1999	0.021	0.080 (09/22)	0	0.061 (07/09)	0.057 (08/23)	0	n/a
	2000	0.021	0.104 (06/04)	0	0.073 06/04)	0.059 (06/27)	0	0.062
	2001	0.022	0.089 (05/22)	0	0.071 (08/10)	0.063 (06/20)	0	0.06
	2002	0.023	0.086 (07/10)	0	0.073 (7/22)	0.056 (06/25)	0	0.059
	2003	0.026	0.098 (09/03)	0	0.077 (09/03)	0.069 (06/07)	0	0.063
	2004	0.021	0.083 (08/09)	0	0.066 (07/24)	0.056 (06/21)	0	0.060
	2005	0.023	0.090 (05/27)	0	0.076 (05/27)	0.057 (08/19)	0	0.061

*Parts per million
† The 8hour ozone standard became effective in 1998;
1-hour values are no longer evaluated for attainment purposes.
The 8 hr standard is the 3-year average of the 4th highest value.

Appendix 2

1992 to 2005 Meteorological Factors Conducive to Ozone Formation
in the Portland-Vancouver Area
(ODEQ, April 2006)

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Appendix 3
Emission Inventory

The Portland-Vancouver AQMA was designated “Unclassifiable/Attainment” with the 8-hour ozone National Ambient Air Quality Standard (NAAQS) on April 30, 2004 (69FR 23829-30), as demonstrated through air quality monitoring data. EPA requires this maintenance plan to demonstrate continued compliance for at least ten years following EPA designation. WSU performed a modeling analysis with SWCAA and DEQ that forecasted ozone levels to 2015 and determined that these areas will continue to meet the standard.

Both Portland and Vancouver maintenance plans accommodate future growth and provides for the protection of public health by ensuring compliance with the 8-hour ozone standard. These maintenance plans continue emission reduction strategies needed to maintain compliance. To approve the maintenance plan, EPA requires permanent and enforceable reductions in emissions to remain in effect throughout the maintenance period.

This emission inventory is provided in compliance with published EPA requirements to formulate a strategy to maintain the NAAQS as a part of each state’s revisions to its State Implementation Plan (SIP). The principal components for development and documentation for the maintenance plan inventories include stationary point sources, stationary area sources, non-road mobile sources, on-road mobile sources, biogenic emission sources, quality assurance implementation, and emissions summaries. Countywide estimates are used to facilitate comparison with future year National Emissions Inventory submittals. The emissions inventory for the Portland-Vancouver AQMA (Oregon portion) includes Clackamas, Multnomah and Washington counties; The emissions inventory for the Washington portion includes Clark county. Complete copies of these emission inventories are on file at SWCAA or DEQ and are available upon request.

The WSU modeling study (Appendix 4) details the emissions inventory that was used to validate the model and evaluate the 2015 simulation. The model meteorology was based on a July 1998 episode in which the Portland area violated the one-hour ozone NAAQS at the Carus monitoring site.

Point source emissions from sources that are not Title 5 point sources were inventoried by DEQ regional staff and SWCAA staff using the following parameters:

Geographic Area	VOC	NOx	CO
AQMA	>10 tons/year	>40 tons/year	>100 tons/year
25-mile buffer	>100 tons/year	>40 tons/year	>100 tons/year
Modeling domain	>100 tons/year	>40 tons/year	>100 tons/year

For point sources, SWCAA used 2002 ‘actual’ data generated from point source annual reports for the attainment year inventory. For 2015, SWCAA and DEQ developed two different growth scenarios for major industrial (point) sources. The scenarios are described in detail in Section 5.0 of this plan.

In this document, the terms “annual emissions” and “typical summer day” emissions are used to categorize the estimated emissions for a particular time period. The annual emissions, in tons per year, are a total amount of emissions for the source category that occurred throughout the year. Typical summer day emissions are those produced on a hot summer weekday. The typical summer day emissions, in pounds per day, are based on the ozone season period from May 1st through the end of September as one in which, historically, the 8-hour ozone standard would most likely be exceeded.

Percentages reported below reflect anthropogenic (human-caused) emissions; biogenic emissions have been subtracted from the total when calculating percentages except when reporting on biogenic emissions themselves.

Annual Emission Inventory

The attainment year emission inventory (2002) for area sources, non-road mobile and on-road mobile sources and Title 5 point sources was developed from the DEQ and SWCAA 2002 Consolidated Emissions Reporting Rule (CERR) National Emission Inventory (NEI) submittal. For point sources, DEQ and SWCAA used 2002 data generated from point source annual reports for the attainment year inventory.

Fireplace and woodstove emissions were included in the annual emission values, but not in the typical summer day values. Wildfires, prescribed fires and structural fires were not included in either the annual averages or the typical summer day values. These sources were not significant in 2002 and not expected to be significant in 2015. Because the maintenance area is predominantly urban/suburban, large wildfires and prescribed fires are not common; therefore, emissions from these sources are insignificant. Structural fires are also considered insignificant sources.

The annual emission inventories are summarized in Tables 10 and 11 below. The annual emissions are included for ease of comparison with future year CERR National Emission Inventory submittals.

Table 10: Portland Area VOC and NO_x Emissions (tons/year)

Portland Area VOC Emissions
Clackamas, Multnomah, Washington Counties)

Source Type	2002 Actual	2015 Projection (no growth allowance)	2015 Maintenance Demonstration
AREA	92,946	108,109	108,109
NON-ROAD	13,260	13,308	13,308
ON-ROAD	23,683	8,538	8,538
POINT	3,056	3,292	21,721
Total	132,944	133,246	151,675

Portland Area NO_x Emissions
(Clackamas, Multnomah, Washington Counties)

Source Type	2002 Actual	2015 Projection (no growth allowance)	2015 Maintenance Demonstration
AREA	5,808	5,822	5,822
NON-ROAD	17,347	17,223	17,223
ON-ROAD	36,786	10,339	10,339
POINT	2,522	2,862	15,191
Total	62,464	36,245	48,574

Table 11 – Vancouver Area VOC and NOx Emissions (tons/year)

Vancouver Area VOC
(Clark County)

Source Type	2002 Actual	2015 Growth Projection	2015 Maintenance Demonstration
AREA	11,636	14,891	14,891
NONROAD	1,797	1,123	1,123
ON-ROAD	6,274	2,616	2,616
POINT	652	**690**	**1,767**
Total	20,359	19,320	20,397

Vancouver Area NOx Emissions
(Clark County)

Source Type	2002 Actual	2015 Growth Projection	2015 Maintenance Demonstration
AREA	602	764	764
NONROAD	2,859	1,991	1,991
ON-ROAD	9,272	3,540	3,540
POINT	1,111	**1,131**	**4,191**
Total	13,844	7,426	10,486

Typical Summer Day Emission Inventory

DOE generated the typical summer day emission inventory for Area, Nonroad and On-road Mobile sources for SWCAA. For area sources and three non-road source categories (commercial marine, locomotives, aircraft), DOE used month and day-of-week profiles appropriate for each individual source category. On-road and all other non-road sources were specifically estimated for summer day conditions. The point sources were not adjusted for a typical summer day as these sources operate at the same levels year round.

DEQ generated the typical summer day emission inventory using the Sparse Matrix Operator Kernel Emissions Modeling System (SMOKE) model to make the seasonal adjustments to the annual emissions inventory. Complete descriptions of the seasonal adjustment factors used to develop typical summer day emissions can be found in the Inventory Preparation Plan, available from DEQ. The SMOKE model was used to seasonally adjust the emissions for the CMAQ model validation, 2002 attainment inventory and 2015 maintenance demonstration emissions inventories.

In both Washington and Oregon, fireplace and woodstove emissions were not included in the seasonally-adjusted area source inventory because they would not likely be used during meteorological conditions conducive to ozone formation (hot, stagnant summer days). Wildfires, prescribed fires and structural fires were also not included in the 2002 Attainment Inventory and 2015 maintenance demonstration inventory because the modeling team's research on source activity during the July 1998 episode indicated that these emissions were not significant during the 1998 episode. These sources were not significant on an annual basis either.

Summary of Portland AQMA Emissions (Clackamas, Multnomah, and Washington Counties)

A summary of the Portland-Vancouver AQMA Ozone Maintenance Plan Emission Inventory for Point, Area, Non-road Mobile and On-road Mobile sources of VOC and NO_x emissions is presented in the following section. Percentages reflect anthropogenic (human-caused) emissions; biogenic emissions have been subtracted from this summary. A full copy of the emission inventory is available upon request from DEQ.

Portland Area VOC and NO_x Emissions, (lb/day)

(Clackamas, Multnomah, Washington Counties)

	--------- VOC, lbs per day ---------				--------- NO_x, lbs per day ---------		
Source Type	2002 Actual	2015 Growth Projection	2015 Maintenance Demonstration	Type Source	2002 Actual	2015 Growth Projection	2015 Maintenance Demonstration
AREA	253,871	291,098	291,098	AREA	5,529	6,157	6,157
BIOGENIC	437,910	437,910	437,910	BIOGENIC	3,890	3,890	3,890
NONROAD	110,188	101,699	101,699	NONROAD	136,713	95,638	95,638
ON-ROAD	139,542	54,521	54,521	ON-ROAD	216,750	68,910	68,910
POINT	17,020	18,304	119,943	POINT	14,913	16,783	86,780
	----------	----------	----------		----------	----------	----------
Totals	958,531	903,531	1,005,171	Totals	377,794	191,378	261,375
Totals Minus Biogenic	520,621	465,621	567,260		373,904	187,487	257,485

2002 Attainment Inventory (Clackamas, Multnomah, and Washington Counties)

During an ozone season day, on-road mobile sources contribute 25% of the total VOC and 58% of the total NO_x air emissions in the Oregon portion of the Portland-Vancouver AQMA. On-road mobile source emissions are based on motor vehicle travel during a typical summer day. The seasonal adjustment factor reflects the fact that emissions would likely increase during the summer months when tourism traffic picks up. Gasoline vehicles contribute 24% of the VOC emissions and 34% of the NO_x emissions within the on-road mobile category; diesel vehicles contribute 24% of the NO_x emissions.

Stationary area sources comprise 54% of the total VOC and 1% of the total NO_x air emissions in the Portland area on a typical summer day. Within the area source category, surface coating contributes 32% of the total VOC emissions while consumer solvents contribute 6% and graphic arts contribute 10% of the VOC emissions. NO_x emissions from area sources are insignificant.

Non-road mobile sources contribute 19% of the total VOC and 37% of the total NO_x emissions on a typical summer day. Off-highway diesel equipment comprises 21% of the daily NO_x emissions; 7% of the total VOC emissions originate from 2-cycle engines within the non-road mobile source category.

Stationary point sources comprise 3% of the VOC and 4 % of the NO_x air emission in the Portland area on a typical summer day.

Biogenic emissions which are produced by vegetation (e.g. terpenes from pine trees) contribute 43% of the total VOC during a typical summer day. Washington State University provided the biogenic emissions data and these emissions are assumed to remain unchanged in the future, although urban development does modify the amount, location and type of vegetation over time.

2015 Maintenance Demonstration (Clackamas, Multnomah, and Washington Counties)
During an ozone season day, on-road mobile sources contribute 12% of the total VOC and 39% of the total NO_x air emissions in the Oregon portion of the Portland-Vancouver AQMA. On-road mobile source emissions are based on motor vehicle travel during a typical summer day and the seasonal adjustment factor reflects the fact that emissions would likely increase during the summer months when tourism traffic picks up. Gasoline vehicles contribute 11% of the VOC emissions and 25% of the NO_x emissions within the on-road mobile category; diesel vehicles contribute 13% of the NO_x emissions.

Stationary area sources comprise 63% of the total VOC and 3% of the total NO_x air emissions in the Portland area on a typical summer day. Within the area source category, surface coating contributes 33% of the total VOC emissions while consumer solvents contributes 9% and graphic arts contribute 13% of the VOC emissions.

Non-road mobile sources contribute 22% of the total VOC and 52% of the total NO_x emissions on a typical summer day. Off-highway diesel equipment comprises 24% of the daily NO_x emissions.

Stationary point sources comprise 4% of the VOC and 9 % of the NO_x air emissions in the Portland area on a typical summer day.

Biogenic emissions which are produced by vegetation (e.g. terpenes from pine trees) contribute 44% of the total VOC during a typical summer day. Washington State University provided the biogenic emissions data and these emissions are assumed to remain unchanged in the future, although urban development does modify the amount, location and type of vegetation over time.

Summary of Vancouver Emissions (Clark County, Washington)

A summary of the Vancouver Area Ozone Maintenance Plan Emission Inventory for Point, Area, Biogenic, Non-road Mobile and On-road Mobile sources is presented in the following section. A full copy of the emission inventory is available upon request from SWCAA.

Vancouver Area VOC and NO_X Emissions, Pounds per Season Day
(Clark County)

Source Type	--- VOC, lbs per day ---			Source Type	--- NO_X, lbs per day ---		
	2002 Actual	2015 Growth Projection	2015 Maintenance Demonstration		2002 Actual	2015 Growth Projection	2015 Maintenance Demonstration
AREA	18,014	21,860	21,860	AREA	665	786	786
BIOGENIC	79,417	79,417	79,417	BIOGENIC	965	965	965
NONROAD	15,374	9,339	9,339	NONROAD	23,222	15,183	15,183
ON-ROAD	38,315	16,026	16,026	ON-ROAD	50,495	19,482	19,482
POINT	3,572	3,780	**9,682**	POINT	6,089	**6,197**	**22,965**
	----------	----------	----------		---------	----------	----------
Totals	154,692	130,421	136,323	Totals	81,436	42,613	59,381
Anthropogenic Totals	75,275	51,004			80,471	41,648	

2002 Attainment Inventory (Clark County)
Biogenic emissions contribute 51% of the total VOC during a typical ozone season day. Biogenic emissions data was provided by Washington State University and are assumed to remain unchanged in the future, although urban development does modify the amount, location and type of vegetation over time.

During an ozone season day, on-road mobile sources contributed 51% of the total human-caused volatile organic compound (VOC) and 63 % of the total nitrogen oxides (NOx) air emissions in the Vancouver area. On-road mobile source emissions are based on motor vehicle travel during a typical summer day. The seasonal adjustment factor reflects the fact that emissions would likely increase during the summer months when tourism traffic picks up.

Stationary area sources in 2002 comprised 24% of the total anthropogenic VOC and 1% of the NOx air emissions in the Vancouver area on a typical summer day. The largest contributors of emissions from this category are architectural coatings and degreasing.

Non-road mobile sources contribute 20% of the total anthropogenic VOC and 29% of the total NOx air emissions on a typical summer day. Emissions from lawn and garden equipment are the majority contributors of ozone precursors from this source category.

Stationary point sources comprised 5% of the anthropogenic VOC and 8 % of the NOx air emission in the Clark county area on a typical summer day in 2002

2015 Maintenance Demonstration (Clark County)
Biogenic emissions which are produced by vegetation (e.g. terpenes from pine trees) contribute 61% of the total VOC during a typical summer day. The estimated emission values used for

2015 biogenic emissions are the same values used for 2002 estimates. Washington State University provided the biogenic emissions data and these emissions are assumed to remain unchanged in the future, although urban development does modify the amount, location and type of vegetation over time.

In the 2015 maintenance demonstration, during an ozone season day, on-road mobile sources would contribute 31% of the total VOC and 47% of the total NO_x air emissions in the Vancouver portion of the Portland-Vancouver AQMA. On-road mobile source emissions are based on motor vehicle travel during weekdays as a typical summer day reflecting increased tourist traffic.

Stationary area sources are predicted to be 43% of the total VOC and 2% of the total NO_x air emissions in the Vancouver area on a typical summer day in 2015.

Non-road mobile sources are projected to contribute 18% of the total VOC and 36% of the total NO_x emissions on a typical summer day.

Stationary point sources emissions in the Vancouver area using the growth projection numbers are projected to represent only 7% of the VOC and 15% of the NOx emissions on a typical summer day.

Appendix 4
Modeling and Maintenance Demonstration

WSU Modeling Study

The Oregon Dept. of Environmental Quality, Washington Dept. of Ecology (Ecology), Southwest Clean Air Agency (SWCAA), Washington State University (WSU) and EPA Region 10 teamed together to perform photochemical modeling for the Portland-Vancouver Air Quality Maintenance Area to improve our understanding of the potential for ozone exceedances in the future. The modeling work involved simulation of a July 1998 episode meteorology that had the highest ozone levels observed in recent years. The model results were compared to available observed data, and the 1998 episode was used as a basis for evaluation of future year (2015) growth projections.

The agencies contracted with WSU to use the CMAQ dispersion model to help assess the status of the Portland-Vancouver airshed with respect to the national ambient air quality standard for tropospheric ozone. The Turner monitoring site is included within the modeling domain and allowed DEQ to asses the status of the Salem-Keizer airshed at the same time.

The modeling effort is documented in the report, “Historical and Future Ozone Simulations Using the MM5/SMOKE/CMAQ System in the Portland-Vancouver Area” (WSU, December 31, 2005), in this Appendix. Although most of the modeling effort has been performed by WSU, DEQ recently developed the technical capability to run the SMOKE and CMAQ simulations in-house.

2015 Projection

The “managed growth projection simulation” in the WSU modeling report is the modeling results described as the “2015 Projection” in the Portland-Vancouver Ozone Maintenance Plan. The emission inventory that was used in that modeling simulation is detailed in an appendix to the WSU report.

2015 Maintenance Demonstration

The “2015 Maintenance Demonstration” in the Portland-Vancouver uses the same emission inventory as the “2015 Projection,” except for point sources. Point sources within Oregon were based on the maximum allowable permitted emission limits (Plant Site Emission Limits), and within Washington were based on allowables proportional to Oregon counties for Washington sources. A point source growth allowance was added to both inventories: 5000 tons VOC and 5000 tons NO_x were added to areas zoned for industrial growth in the Oregon portion of the Portland-Vancouver AQMA, and a proportional amount of 411 tons of VOC and 1313 tons of NOx was added to areas zoned for industrial growth in the Washington portion of the Portland-Vancouver AQMA.

The results of the modeled attainment test are described in Appendix 6.

Appendix 5

Economic Report to the Metro Council
2000-2030 Regional Forecast
for the Portland-Vancouver Metropolitan Area
(Data Resource Center, Metro, December 2002 final draft)

Appendix 6
Modeled Attainment Test

Appendix 6 details how SWCAA, Ecology and DEQ applied the modeled attainment test to the 2015 Maintenance Demonstration modeling results.

The modeled attainment test is an exercise in which an air quality model is used to simulate current and future air quality. The 8-hour NAAQS for ozone requires the fourth highest 8-hour daily maximum ozone concentration, averaged over three consecutive years, to be less than 80 ppb[6] . The recommended attainment test is one in which model estimates are used in a “relative” rather than “absolute“ sense. That is, take the ratio of the model’s future to current (baseline) predictions at ozone monitors. EPA calls these ratios “relative reduction factors”. Future ozone concentrations are estimated at existing monitoring sites by multiplying a modeled relative reduction factor at locations near each monitor by the observation-based, monitor-specific, “baseline” ozone design value. The resulting predicted future concentrations are compared to 84 ppb.

For more information, see “Guidance on the Use of Models and Other Analyses in Attainment Demonstrations for the 8-hour Ozone NAAQS” (EPA-450/R-05-002, October, 2005).

[6] Because of rounding conventions in which non-significant figures are truncated, a modeling estimate of <85 ppb is equivalent to <= 84 ppb. Attainment is demonstrated when a modeling target of future estimates of ozone concentrations are <=84 ppb.

Portland-Vancouver AQMA Analysis of 8-Hour Ozone Maintenance using the CMAQ dispersion model

Step 1. Current Design Value (1998 "observed" values)

Year	4th High (ppb)					
	Carus	Milwaukie	Sauvie Island	Mt View	Turner	Wishram
1996	99	85	76	81	92	70
1997	62	54	53	53	61	60
1998	81	61	66	69	77	63
1999	72	51	49	57	65	63
2000	65	56	54	58	59	66

Monitoring Site	Design Values			Current Design Value (DVC)
	1996-1998	1997-1999	1998-2000	
Carus	81	72	73	75.0
Milwaukie	67	55	56	59.3
Sauvie Island	65	56	56	59.1
Mt View	68	60	61	62.9
Turner	77	68	67	70.4
Wishram	64	62	64	63.4

Step 2. Determination of Maintenance, 2015 projection including growth allowance

Carus

Day	Current Design Value (DVC)	1998 Baseline 8-Hour Max	2015 Predicted 8-Hour Max	Relative Reduction Factor (RRF)	Future Design Value (DVF)
1		90	86		
2		97	92		
3		107	103		
Mean	75.0	98	94	0.955	71.7

Milwaukie

Day	Current Design Value (DVC)	1998 Baseline 8-Hour Max	2015 Predicted 8-Hour Max	Relative Reduction Factor (RRF)	Future Design Value (DVF)
1		86	93		
2		91	92		
3		98	102		
Mean	59.3	92	96	1.046	62.1

Sauvie Island

Day	Current Design Value (DVC)	1998 Baseline 8-Hour Max	2015 Predicted 8-Hour Max	Relative Reduction Factor (RRF)	Future Design Value (DVF)
1		70	69		
2		90	79		
3		87	80		
Mean	59.1	82	76	0.923	54.5

Mtn View

Day	Current Design Value (DVC)	1998 Baseline 8-Hour Max	2015 Predicted 8-Hour Max	Relative Reduction Factor (RRF)	Future Design Value (DVF)
1		76	81		
2		86	77		
3		88	87		
Mean	62.9	83	81	0.975	61.3

Turner

Day	Current Design Value (DVC)	1998 Baseline 8-Hour Max	2015 Predicted 8-Hour Max	Relative Reduction Factor (RRF)	Future Design Value (DVF)
1		74	64		
2		101	88		
3		89	73		
Mean	70.4	88	75	0.852	60.0

Wishram

Day	Current Design Value (DVC)	1998 Baseline 8-Hour Max	2015 Predicted 8-Hour Max	Relative Reduction Factor (RRF)	Future Design Value (DVF)
1		55	51		
2		56	51		
3		59	52		
Mean	63.4	57	52	0.910	57.7

*The Wishram monitoring site is not within the Portland-Vancouver AQMA or Salem Area Ozone Maintenance Plan areas. Wishram data is included here for informational purposes only.

Appendix 7
Vancouver Control Strategies

SWCAA Regulations

SWCAA 400 - General Regulations for Air Pollution Sources, last updated 12/16/05

- 400-030 – Definitions – strikeout proposed version, (last adopted 11/9/03)
- 400-101 – Sources Exempt from Registration Requirements – strikeout version (last adopted 11/9/03)
- 400-109 – Air Discharge Permit Applications (Notice of Construction), as adopted 12/16/05
- 400-110 – New Source Review, as adopted 11/9/03
- 400-111 - Requirements for New Sources in a Maintenance Plan Area - strikeout proposed version, (last adopted 11/9/03)
- 400-112 – Requirements for New Sources in Nonattainment Areas (as adopted 11/9/03)
- 400-113 - Requirements for New Sources in an Attainment or Nonclassifiable Area – strikeout version with proposed changes (last adopted 11/9/03)
- 400-114 - Requirements for Replacement of Substantial Alteration of Emission Control Technology at an Existing Stationary Source, (as adopted 11/9/03)
- 400-116 – Maintenance of Equipment, (as adopted 11/9/03)
- 400-190 – Requirements for New Sources in Nonattainment Areas, (as adopted 11/9/03)

SWCAA 490- Emission Standards and Controls for Sources Emitting Volatile Organic Compounds, adopted March 18, 2001, no current rulemaking

SWCAA 491- Emission Standards and Controls for Sources Emitting Gasoline Vapors, adopted March 18, 2001, no current rulemaking

SWCAA 493- VOC Area Source Rules, adopted May 25, 1996, no current rulemaking

Washington State Regulations

Chapter 173 422 WAC Motor Vehicle Emission Inspection, effective date June 3, 2002 (supporting sections 422-030, 422-050, 422-060, 422-070, 422-170, 422-190, entire 173-422 included)

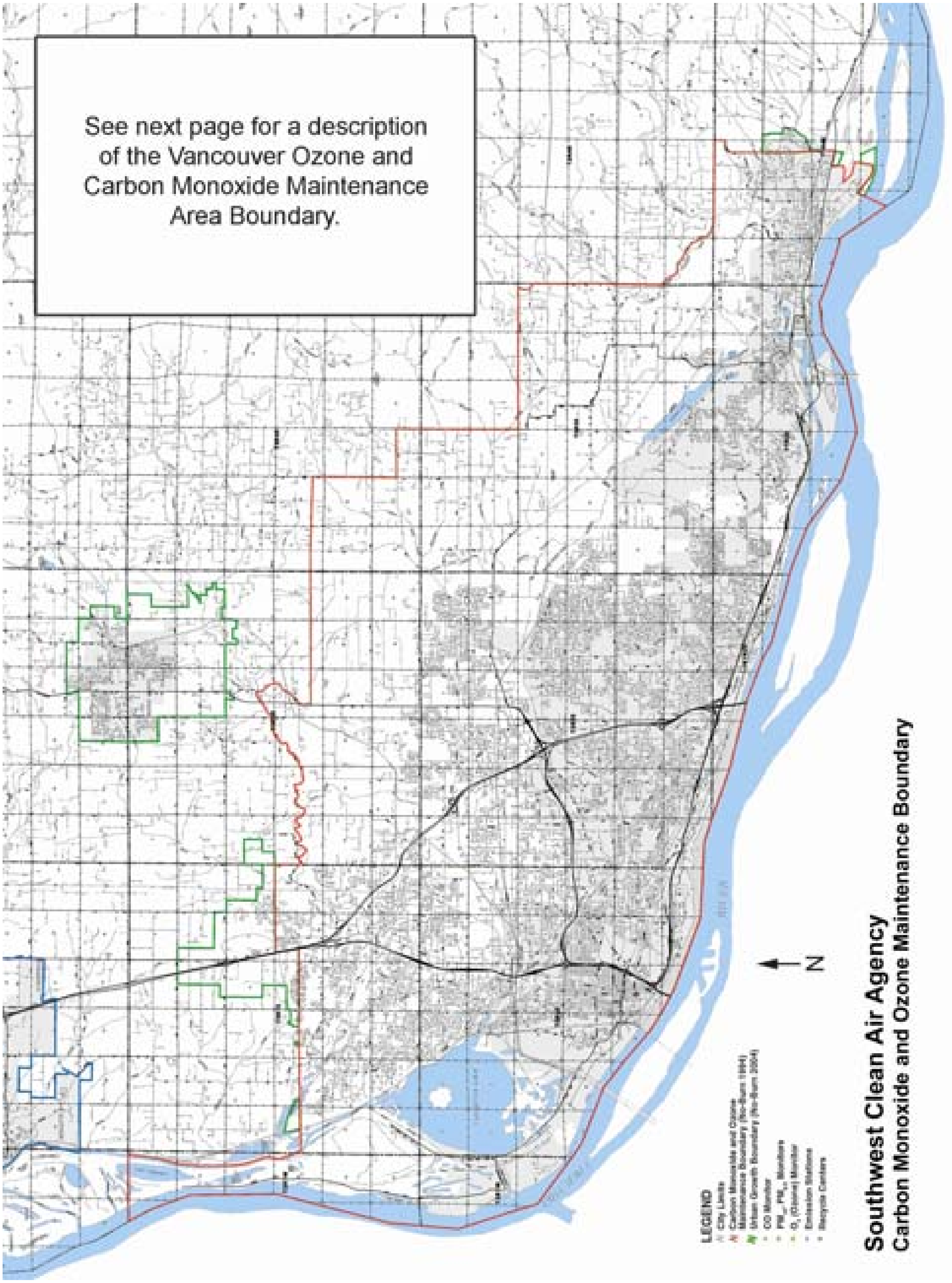
Appendix 8
Other Emission Reduction Programs Information

Commute Trip Reduction Program Information

Commute Trip Reduction Efficiency Act Frequently Asked Questions and Presentation

Washington State Department of Transportation CTR Performance Grants Information

Appendix 9
Vancouver Attainment Area Map and Description



Southwest Clean Air Agency Maintenance Area Map

Description of the Vancouver Ozone and Carbon Monoxide Maintenance Area Boundary

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

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