
Treasure Valley Vehicle Inspection and Maintenance Program Annual Review

Including Director's Recommendation for the
2018 Idaho State Legislature



**State of Idaho
Department of Environmental Quality
1410 North Hilton
Boise, Idaho 83706**

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Summary

This review summarizes the Vehicle Inspection and Maintenance (I/M) Program in both Ada and Canyon Counties by reviewing the current air quality in the Treasure Valley, discussing the current emission reductions obtained, and evaluating the effectiveness of an I/M program as required by Idaho Code §39-116B(5). In accordance with Idaho Code §39-116B(6), this report includes the Idaho Department of Environmental Quality (DEQ) director's review and recommendation for the continuance of the I/M program.

Background

The Treasure Valley Air Quality Council was appointed by the governor to protect, preserve, and where necessary, improve air quality in the Treasure Valley while accommodating private, public, and commercial interests. As a result of the recommendations by the council in its Treasure Valley Air Quality Plan, the Idaho Legislature enacted and the governor signed into law Idaho Code §39-116B, "Vehicle Inspection and Maintenance Program." Passed in 2008, this law laid the ground work for requiring vehicle emissions testing in areas of the state where air quality is compromised.

Idaho Code §39-116B(1) instructs that a vehicle I/M program shall be developed when the Director determines the following two conditions are met:

- (a) An airshed, as defined by the department, within a metropolitan statistical area, as defined by the United States office of management and budget, has ambient concentration design values equal to or above eighty-five percent (85%) of a national ambient air quality standard, as defined by the United States Environmental Protection Agency, for three (3) consecutive years starting with the 2005 design value; and
- (b) The department determines air pollutants from motor vehicles constitute one (1) of the top two (2) emission sources contributing to the design value of eighty-five percent (85%).

Ada and Canyon Counties—which are within the "Boise City – Nampa, ID" metropolitan statistical area defined by the US Office of Management and Budget—met the criteria specified in the law in 2008 and continue to do so today, as data shows the design value for ozone exceeds 85% of the National Ambient Air Quality Standard (NAAQS) and vehicle emissions constitute one of the top two emission sources contributing to ozone concentrations in the Treasure Valley. According to the US Environmental Protection Agency (EPA), a design value is defined as the monitored reading used to determine an area's air quality status; an ozone design value is calculated by averaging the fourth-highest daily maximum 8-hour concentrations over a 3-year period.

Ada County has had a vehicle emissions testing program in operation since 1984 as a result of local ordinances enacted as a control measure after Ada County was designated as a carbon monoxide (CO) nonattainment area. The Ada County program remains federally enforceable in Idaho's CO maintenance plan. In 2010, Ada County and all of its cities except Kuna executed a joint powers agreement with DEQ ensuring that the Ada County program meets the requirements of Idaho Code §39-116B in addition to those within the CO maintenance plan. The Ada County program is managed by the Air Quality Board.

In 2010, vehicle emissions testing began in Canyon County and the city of Kuna in Ada County in accordance with Idaho Code §39-116B. As of February 2015, DEQ contracts with Applus Technologies Inc. to operate the program in Canyon County and the city of Kuna.

Idaho Code §39-116B(5) directs that “The department shall annually review the result of the vehicle inspection and maintenance program. The review shall include, among other things, an estimate of the emission reduction obtained from the number of vehicles that initially fail the test and then pass after maintenance.” Furthermore Idaho Code §39-116B(6) states “Every five years..., the director shall review the air quality data and make recommendations to the legislature for its determination whether a program initially established pursuant to the provisions of this section should be continued, modified or terminated.”

Air Quality in the Treasure Valley

Historically, the Treasure Valley has been successful in reducing CO and coarse particulate matter (PM₁₀) emissions largely due to improved efficiency of motor vehicle engines, an emissions testing program in Ada County targeting carbon monoxide, and local restrictions associated with open burning and wood heating restrictions. However, with the continued rapid growth in the number of vehicles in operation and the total vehicle miles traveled (VMT), a concern remains regarding ground-level ozone. Ground-level ozone is difficult to control due to the complexity and number of chemical agents (precursors) involved in its formation. The precursor pollutants nitrogen oxides (NO_x) and volatile organic compounds (VOCs) are often released as byproducts of combustion and from evaporation of fuels and solvents. These precursors react in sunlight to form ozone. These precursors also contribute to the formation of fine particulate matter (PM_{2.5}).

The current NAAQS for ozone is 70 parts per billion (ppb), as promulgated by EPA in 2015. DEQ began monitoring ozone in the Treasure Valley in 2001. Ozone levels are measured from April through September at two locations in the Treasure Valley. Based on ozone monitoring data from 2014 through 2016, the current Treasure Valley design value is 67 ppb. The Treasure Valley’s design value remains below the NAAQS but is greater than 85% of the standard (95.7% of the current NAAQS).

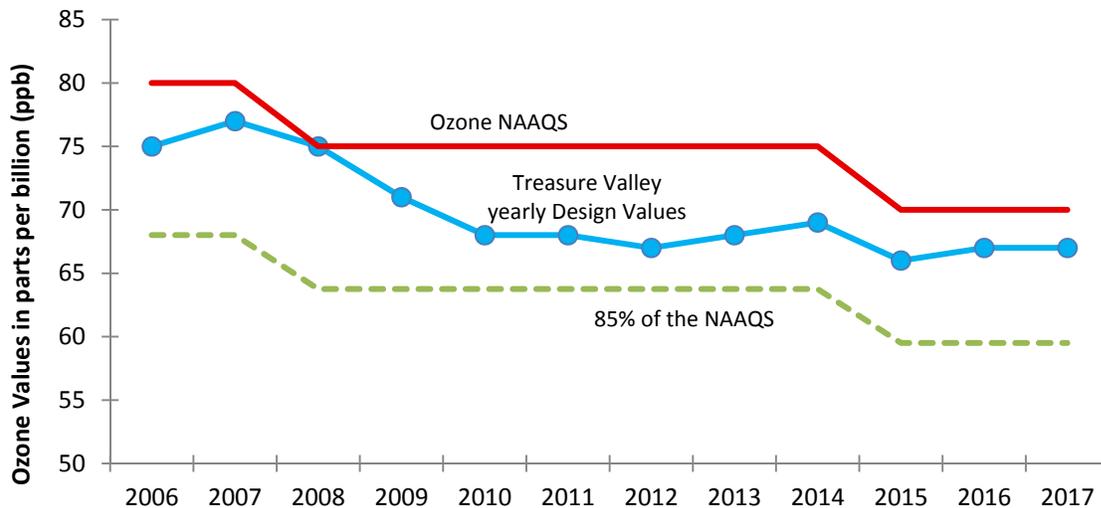


Figure 1. Ozone levels in the Treasure Valley.

EPA proposed and finalized a change to the 8-hour ozone National Ambient Air Quality Standard (NAAQS) to 70 ppb, which went into effect in 2015. Design Values (ppb): 75 (2006); 77 (2007); 75 (2008); 71 (2009); 68 (2010); 68 (2011); 67 (2012); 68 (2013); 69 (2014); 66 (2015); 67 (2016); 67 (2017, preliminary data).

Identified in Figure 1 are the Treasure Valley’s yearly ozone design values for 2006–2016, including the preliminary value for 2017. The figure shows the range between the NAAQS and the 85% threshold established by Idaho Code §39-116B. Ozone in the Treasure Valley has declined since 2007, keeping pace as EPA has tightened the ozone standard. However, the historical values show the possibility of an ozone nonattainment designation for the Treasure Valley in the future if the values are not preserved at these lower levels or if EPA continues to lower the standard.

Influence of Vehicles

In order to determine the sources and their contribution to air pollution two tools are used, an emissions inventory – a comprehensive estimate of air emissions of criteria pollutants and their precursors from air emissions sources and air quality modeling – a mathematical simulation of how air pollutants disperse and react in the atmosphere to affect ambient air quality. Based on the most recent in-depth emission inventory for the Treasure Valley motor vehicles are one of the top two sources of the ozone precursor pollutants NOx and VOCs (Figure 2). Vehicles are the top source of NOx emissions; all other sources combined are less than half of the NOx emissions from vehicles. For the precursor pollutant VOCs, vehicles are exceeded only by vegetation, a biogenic source; of these top two sources, vehicle emissions can be effectively controlled.

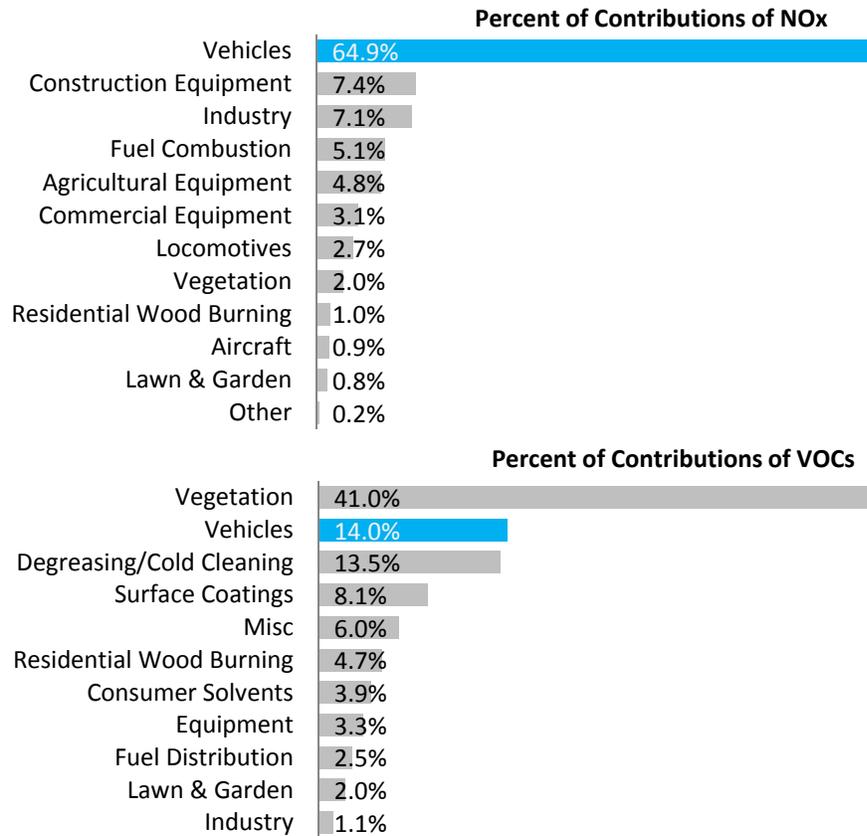


Figure 2. Ozone precursor emissions by source.

Vehicles are the top contributor to NOx in the Treasure Valley at 65% and second only to biogenic sources for VOCs at 14%.

The magnitude of ozone precursor emissions depends on the average vehicle emission rates and the annual vehicle miles traveled, among other things. The emission reduction estimates discussed below are based on the VMT levels in Figure 3. VMT for the Treasure Valley is expected to increase by 30% in Ada County and 28% in Canyon County in the next 10 years as the valley’s population continues to increase. More vehicles and more miles traveled will have a negative impact on the air quality in the Treasure Valley.



Figure 3. Total annual vehicle miles traveled (VMT) estimates.
VMT estimates are in billions of miles.

Program Effectiveness

The effectiveness of an emissions testing program can be described in terms of its failure, compliance, and waiver rates and estimated emission reductions. Table 1 shows the failure, compliance, and waiver rates for calendar years 2013–2016, along with the total number of vehicles tested.

Table 1. Failure, compliance, and waiver rates.

	2013		2014		2015		2016	
	Ada	Canyon	Ada	Canyon	Ada	Canyon	Ada	Canyon
Vehicles tested	127,485	46,958	131,614	41,650	129,333	51,479	135,862	54,115
Failure rate	8.73%	10.87%	8.53%	10.27%	9.25%	8.60%	9.11%	10.41%
Compliance rate	96.10%	96.36%	97.01%	96.24%	96.84%	92.00%	96.6%	95.3%
Waiver rate	0.44%	0.29%	0.37%	0.22%	0.29%	0.50%	0.18%	0.61%

The failure rate reflect the percentage of tested vehicles that fail the initial test and are required to either obtain repairs and pass a retest or obtain a waiver due to financial hardship or repair costs.

The compliance rate reflect the percentage of vehicles due for testing that have either passed an emissions test or received a waiver.

The *waiver rate* is the percentage of vehicles that obtain an approved waiver. The I/M program in Ada and Canyon Counties offer two forms of waivers to assist motorists who might be struggling with compliance: repair waivers and financial hardship waivers. A repair waiver is available to individuals who spend a minimum amount on emissions-related repairs for a vehicle that has failed an emissions test. A hardship waiver is granted to an individual who provides proof that a financial hardship would be endured to complete the necessary repairs to a vehicle that has failed an emissions test.

When Idaho Code §39-116B was enacted in 2008, emissions modeling was conducted to estimate the annual ozone precursor emission reductions that would be achieved by the two-county I/M programs. DEQ uses the latest emissions model to evaluate emission reductions to assess the continued benefit of the I/M program. The emission reductions are determined by modeling the vehicle emissions of failing vehicles that are repaired and then obtain a passing test.

Figure 4 shows the estimated emission reductions due to repairing noncompliant vehicles for those same calendar years, along with initial estimates from 2008. These results are consistent with other I/M programs throughout the United States. As the programs mature and older vehicles are replaced with newer vehicles that are required to meet more stringent Federal emission standards, the emission reductions from the I/M programs will slowly decrease, as seen in Figure 4.

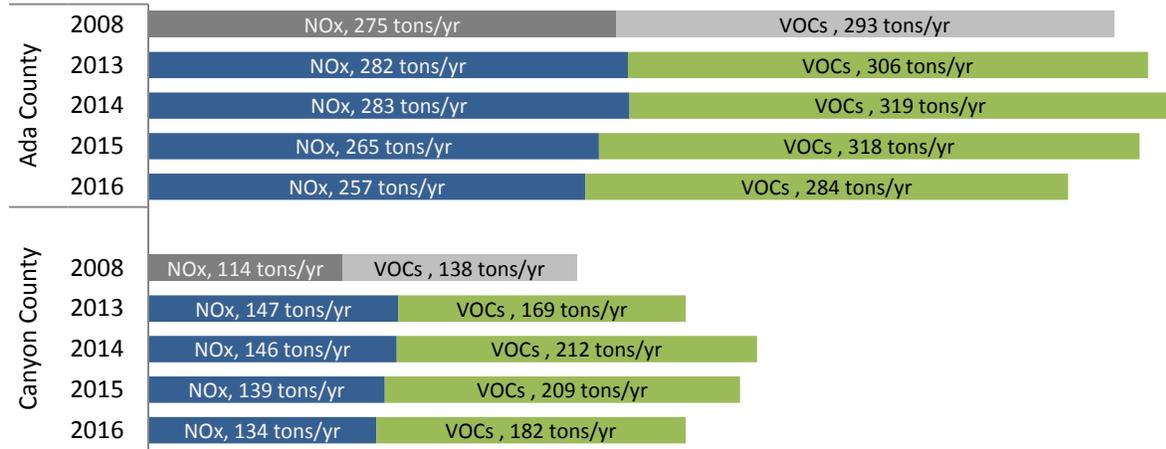


Figure 4. Annual ozone precursor modeled emission reductions by county.
 The total emission reductions by year in Ada County are 568 tons/year (2008), 588 tons/year (2013), 602 tons/year (2014), 583 tons/year (2015), and 541 tons/year (2016). The total emission reductions by year in Canyon County are 252 tons/year (2008), 316 tons/year (2013), 358 tons/year (2014), 348 tons/year (2015), and 316 tons/year (2016).

Program Review

DEQ looked at the following aspects of the I/M program to assess their impact to the total emission reductions: model years tested, type of tests performed, and fuel type. At this time, modeling results justify the continuation of the present testing criteria. Results show that by requiring properly maintained and repaired vehicles, the I/M program reduces the effects of ozone in the Treasure Valley by reducing NOx and VOCs, both of which are heavily affected by vehicles (Figure 2). Combined the emissions testing program in Ada and Canyon Counties continues to provide emission reductions greater than modeled at the inception of Idaho Code §39-116B as seen in Figure 5.

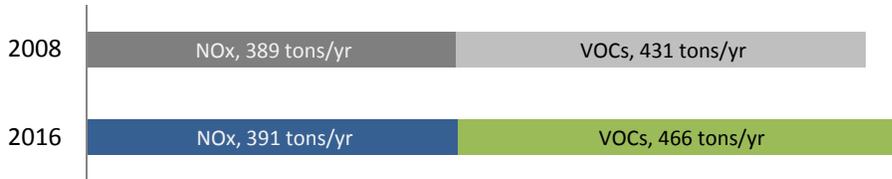


Figure 5. Treasure Valley combined annual ozone precursor modeled emission reductions
 The comparison between the 2016 emission reductions for Ada and Canyon Counties and the 2008 proposed reductions.

In addition to reducing ozone, an I/M program also helps to reduce wintertime PM_{2.5} levels. During winter inversions, NOx combines with ammonia to form ammonium nitrate, a secondary aerosol. Secondary aerosols are the largest contributors to the Treasure Valley’s PM_{2.5} levels when inversion conditions exist.

As part of the ongoing air quality public awareness and outreach program required by Idaho Code §39-116B(2)(g), seasonal public service announcements are broadcasted in the Treasure Valley. Additionally, DEQ has worked with other local advertising companies to broadcast air quality messages on regional transit buses and digital billboards. The public service announcements and other outreach material developed by the Air Quality Board and DEQ provide the public with information on air quality issues and actions the public can take to help improve air quality.

Conclusion and Recommendations

According to Idaho House Bill 586, “This legislation [§39-116B] provides authority to the Department of Environmental Quality to establish a vehicle emission testing and maintenance program to control air pollution emissions from vehicles in air-sheds that are approaching non-attainment with applicable air quality standards and rules.” The Treasure Valley continues to meet both of the triggers specified in Idaho Code §39-116B: the ozone design value is greater than 85% of the 8-hour ozone NAAQS (Figure 1) and vehicles are one of the top two contributors to the design value (Figure 2).

Since the enactment of Idaho Code §39-116B, EPA has lowered the health-based NAAQS for ozone twice: from 80 to 75 ppb in 2008 and from 75 to 70 ppb in 2015. While monitoring data for the Treasure Valley has shown a downward trend in ozone levels since 2007, even as the ozone standard has become increasingly more stringent, the margin between complying with the standard and violating the standard remains small. The possibility of an ozone nonattainment designation for the Treasure Valley continues to hinge on the vehicle I/M program, more stringent motor vehicle emission standards for new vehicles, and efforts by industry and the public to reduce harmful pollutants.

The I/M program continues to be an effective method for reducing ozone precursor emissions. Modeling results continue to show that the I/M program in Ada and Canyon Counties provides emissions reductions greater than originally estimated in 2008 (Figure 4). These results confirm the determination by the Treasure Valley Air Quality Council that the two-county testing program is one of the most effective and proactive control measures available to reduce ozone precursors such as NO_x and VOCs, as well as wintertime PM_{2.5} levels, in the Treasure Valley.

The DEQ director recommends that the I/M program in Ada and Canyon Counties be continued pursuant to the provisions of Idaho Code §39-116B.