

CHAPTER 2: AIR QUALITY

2.1 Air Pollution

To combat our nation's growing air pollution problem, the Environmental Protection Agency (EPA) sets concentration standards, known as National Ambient Air Quality Standards (NAAQS), for six principal pollutants: ozone, particulate matter, carbon monoxide, sulfur dioxide, nitrogen dioxide, and lead. The North Central Texas (NCT) region's primary focus is ozone due to the EPA's nonattainment designation for the region. Up-to-date regional information is available on the North Central Texas Council of Governments' ozone website, www.nctcog.org/trans/air/ozone.

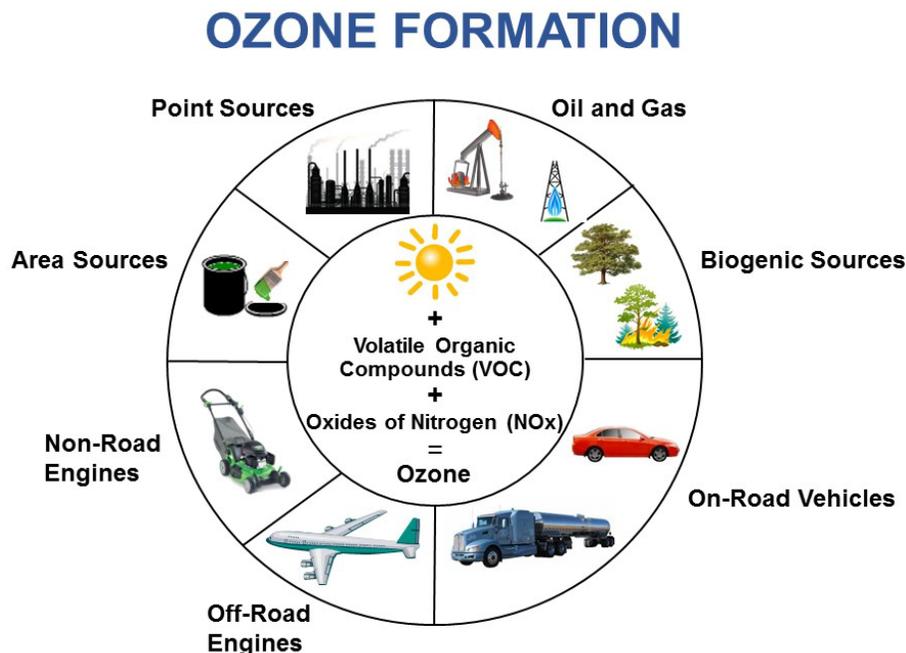
2.1.1 Ground Level Ozone

Unlike the protective ozone layer in the stratosphere, ground level ozone is associated with numerous adverse effects to animal and plant life. Populations most at risk to suffer effects due to increased ozone concentrations include children, elderly, adults who are active outdoors, and people with respiratory problems.

Ground level ozone is a colorless compound formed photochemically (caused by sunlight) in the lower atmosphere when volatile organic compounds (VOC) react with nitrogen oxides (NO_x). Meteorological conditions, including humidity, wind speed, and temperature, impact ozone formation and how long it remains in the atmosphere. Calm weather days with low wind speeds and warm temperatures are favorable conditions for ground level ozone formation. This process is illustrated in Exhibit 2.1.1-1.

As expected, daily ozone concentrations are highest during the summer months, which is why the period between March 1 and November 30 is designated as "Ozone Season" in NCT. The intensity of sunlight necessary for photochemically initiated reactions is highest during this time period.

Exhibit 2.1.1-1: Ozone Precursors (NO_x and VOC) Sources



Source: NCTCOG Transportation Department

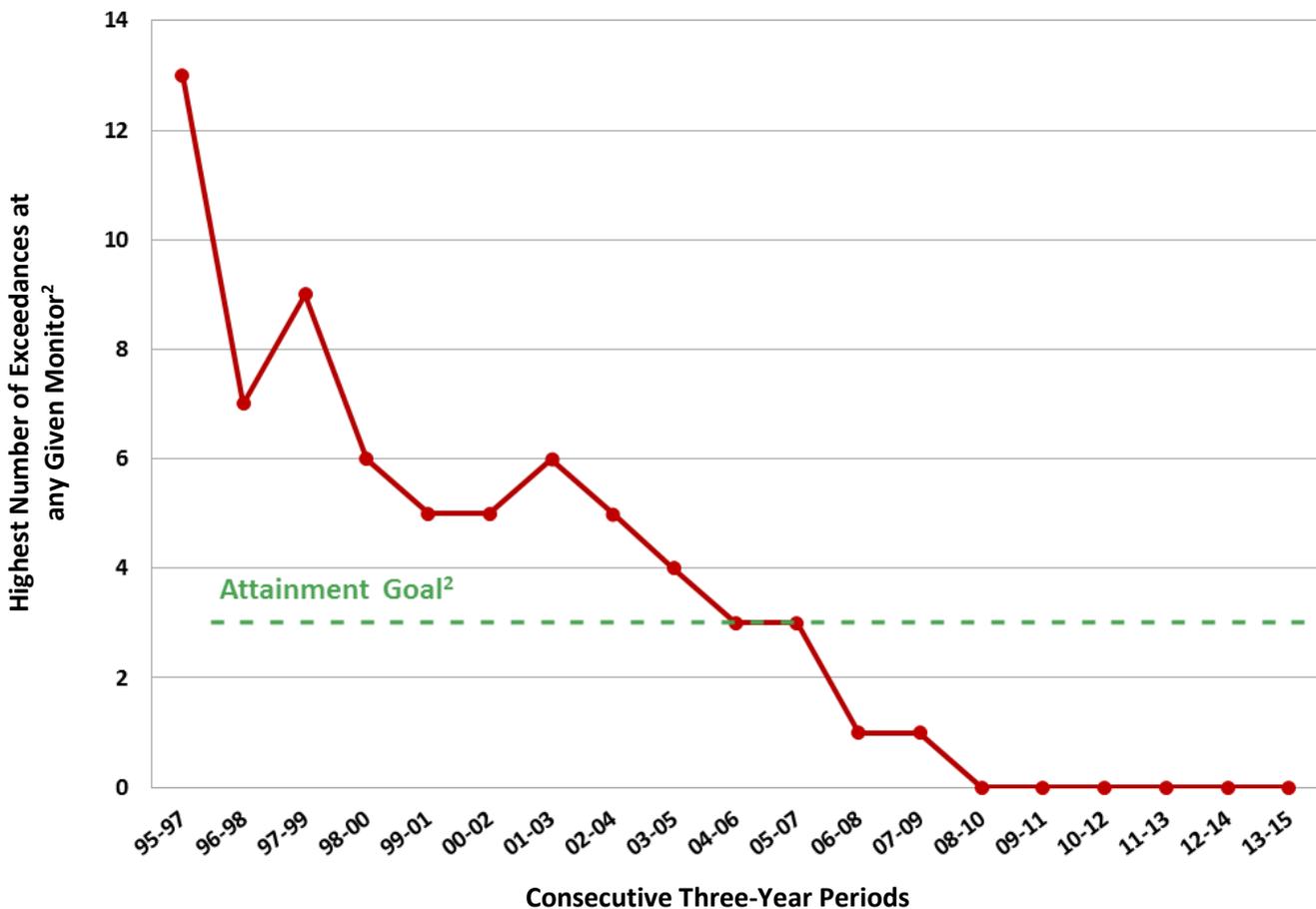
2.2 Background on the North Central Texas Ozone Nonattainment Area

2.2.1 1-Hour Ozone NAAQS

In 1991, four counties in the Dallas-Fort Worth (DFW) area were classified as “moderate” nonattainment in accordance with the Federal Clean Air Act Amendments of 1990 under the 1-Hour Ozone NAAQS. This standard set a maximum limit concentration of 125 parts per billion (ppb). Under the 1-Hour Ozone NAAQS, no air quality monitoring site in Collin, Dallas, Denton, and Tarrant counties was allowed to have more than three exceedances of the set concentration limit over a consecutive three-year period.

As indicated by ozone monitoring, the Dallas-Fort Worth 1-hour ozone nonattainment area came into attainment following the 2006 ozone season, and the region continues to remain in attainment. The decreasing exceedance trend line, shown in Exhibit 2.2.1-1, along with the region coming into attainment under this NAAQS, illustrates the effectiveness of the many air quality projects and programs developed and implemented in our region.

Exhibit 2.2.1-1: 1-Hour Ozone Historical Trends



Source: NCTCOG Transportation Department

² Attainment Goal - According to the US EPA NAAQS, attainment is reached when there are no more than three exceedances per monitor within a consecutive three-year period. An exceedance occurs when the ozone concentration is ≥ 125 ppb average over a one-hour period.

2.2.2 8-Hour Ozone NAAQS

After careful review of human health effects brought about by long-term exposure to ozone, the EPA decided to replace the 1-Hour Ozone NAAQS with a more stringent 1997 8-Hour Ozone NAAQS, less than 85 ppb. The EPA also introduced the concept of a design value to determine a region's attainment status. The design value is defined as the fourth-highest 8-hour average ozone concentration averaged over a consecutive three-year period.

On April 30, 2004, the EPA published air quality designations and classifications for the 1997 8-Hour Ozone NAAQS, with an effective date of June 15, 2004.³ The EPA classified nine counties, Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, and Tarrant as "moderate" nonattainment, with an attainment date of June 15, 2010. As a result of not reaching the "moderate" attainment deadline, the NCT nonattainment area was reclassified as a "serious" nonattainment area for the 1997 8-Hour Ozone NAAQS by the EPA on December 20, 2010, with an effective date of January 19, 2011.⁴ Under the "serious" designation, the NCT nonattainment area had until June 15, 2013 to reach attainment for the 1997 8-Hour Ozone NAAQS.

On March 27, 2008, the EPA revised the 8-Hour Ozone NAAQS from <85 ppb to ≤75 ppb; however, the EPA did not finalize the designations under this new standard until 2012. On May 21, 2012, the EPA published air quality designations for the 2008 8-Hour Ozone NAAQS, effective July 20, 2012.⁵ The Dallas-Fort Worth region was classified as "moderate" nonattainment for the 2008 8-Hour Ozone NAAQS, Wise County was added as the tenth nonattainment county, and the EPA revoked the 1997 8-Hour Ozone NAAQS for Transportation Conformity. Under this revised standard, the US Department of Transportation approval of a Transportation Conformity determination for the 10 counties was required by July 20, 2013, and the region had to reach attainment by December 31, 2018.

On December 23, 2014, a District of Columbia Circuit Court opinion⁶ reversed the December 31 attainment date established in the EPA's 2008 8-hour ozone implementation rule to July 20. For the Dallas-Fort Worth "moderate" nonattainment area, the new attainment date was July 20, 2018, exactly six years from the official date of designation. The EPA published the State Implementation Plan requirements for the 2008 8-Hour Ozone NAAQS on March 6, 2015, and also revoked the 1997 8-Hour Ozone NAAQS.⁷

On September 1, 2015, the EPA published a Clean Data Determination for the nine counties designated as nonattainment for the 1997 8-Hour Ozone NAAQS.⁸ The following month, on October 23, the EPA published the final rule revising the 8-Hour Ozone NAAQS to ≤70 ppb.⁹ On November 8, 2016, the EPA published the final rule approving the DFW Redesignation Substitute Report, providing a finding of attainment for the 1-Hour and 1997 8-Hour Ozone NAAQS, effective December 8, 2018.¹⁰ The EPA's revocation of the 1997 8-Hour Ozone NAAQS was challenged in the US Court of Appeals for the District Court of Columbia Circuit. The EPA filed a request for a panel rehearing on April 23, 2018 to overturn the Court's decision to vacate the 2008 8-Hour Ozone NAAQS implementation rule, which revoked the 1997 8-Hour Ozone NAAQS.¹¹

On April 30, 2018, the EPA signed a final rule¹² classifying nine counties (Collin, Dallas, Denton, Ellis,

³ [69 FR 23858](#)

⁴ [75 FR 79302](#)

⁵ [77 FR 30087](#)

⁶ [https://www.cadc.uscourts.gov/internet/opinions.nsf/E97A64FFBFE4DC1D85257DB70054D5EE/\\$file/12-1321-1528834.pdf](https://www.cadc.uscourts.gov/internet/opinions.nsf/E97A64FFBFE4DC1D85257DB70054D5EE/$file/12-1321-1528834.pdf)

⁷ [80 FR 12263](#)

⁸ [80 FR 52630](#)

⁹ [80 FR 65291](#)

¹⁰ [81 FR 78668](#)

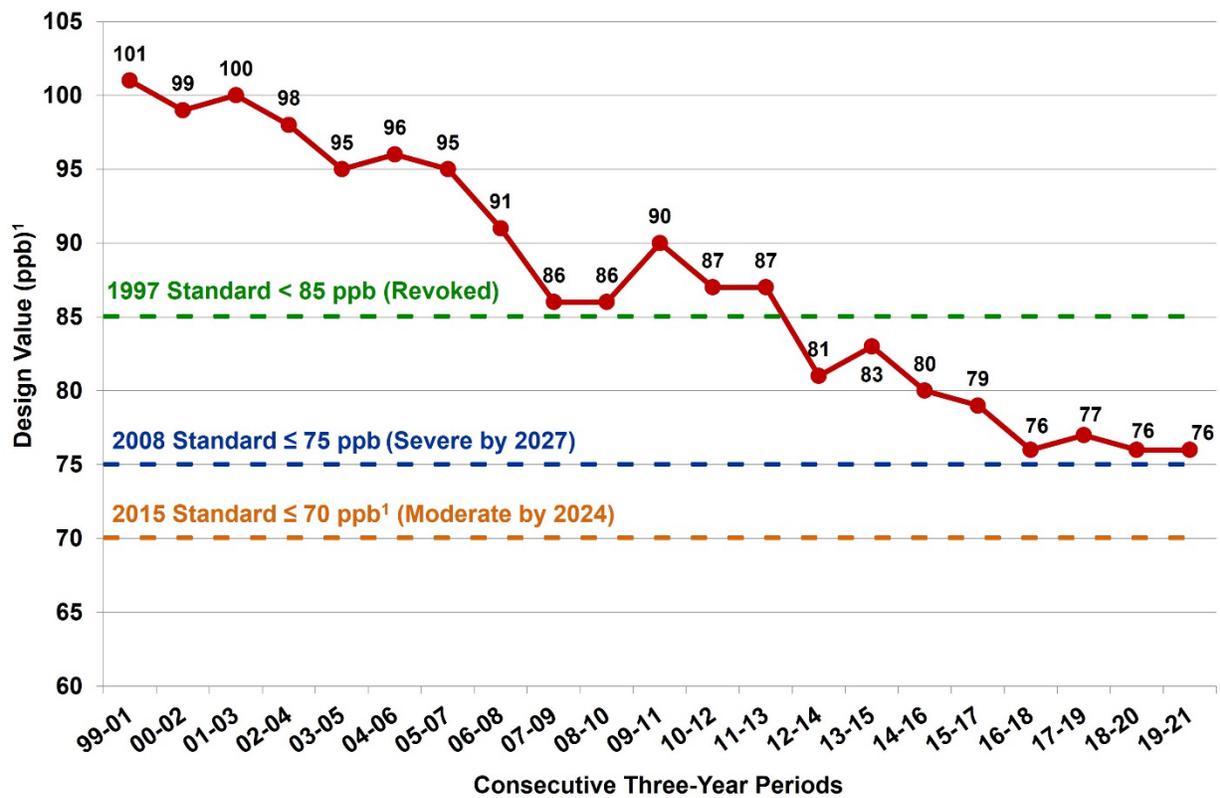
¹¹ http://www.texastwg.org/wp-content/uploads/2018/04/2018-04-Petition_for_Panel_Rehearing-as-filed.pdf

¹² <https://www.epa.gov/sites/production/files/2018-04/documents/placeholder.pdf>

Johnson, Kaufman, Parker, Tarrant, and Wise) as marginal nonattainment for the 2015 8-Hour Ozone NAAQS. Under this marginal classification, the region had until August 3, 2021 to reach attainment. The region did not reach the 2008 NAAQS attainment by July 20, 2018 and was reclassified to “serious,” with an effective date of September 23, 2019, and a July 20, 2021 attainment date. The region did not attain either the 2008 or 2015 standards by the set attainment dates and are in the process of being reclassified to “severe” and “moderate,” respectively.

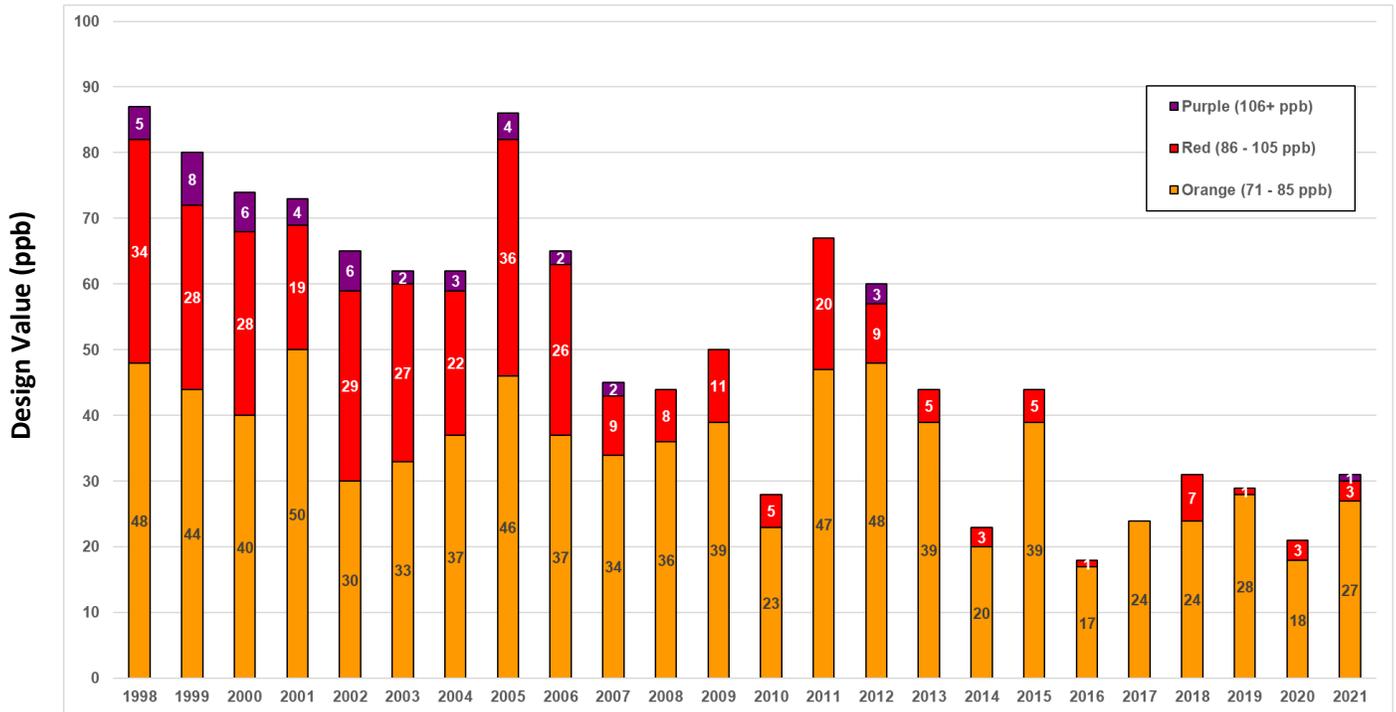
Despite the region being above the concentration goal, there continues to be steady progress towards compliance as a result of many expanded or new emissions reduction control strategies. Exhibit 2.2.2-1 shows the historical design values in relation to the different 8-Hour Ozone NAAQS and Exhibit 2.2.2-2 shows the number of exceedance days, based on the 2008 and 2015 Ozone NAAQS.

Exhibit 2.2.2-1: 8-Hour Ozone Historical Trends



¹³ Attainment Goal - According to the US EPA National Ambient Air Quality Standards, attainment is reached when, at each monitor, the *Design Value* (three-year average of the annual fourth-highest daily maximum 8-hour average ozone concentration) is ≤ 70 ppb.

Exhibit 2.2.2-2: North Central Texas Nonattainment Area Annual Exceedance Days for the 2008 and 2015 Ozone NAAQS



¹⁴ Exceedance level indicates daily maximum 8-hour average ozone concentration, and are based on Air Quality Index thresholds established by the EPA for the revised ozone standard of ≤70 ppb.

Provided in Exhibit 2.2.2-3 is a NCT air quality historical summary for the 1-Hour Ozone NAAQS and the 1997, 2008, and 2015 8-Hour Ozone NAAQS since designation.

Exhibit 2.2.2-3: North Central Texas Ozone Nonattainment Area Air Quality History

1-HOUR OZONE NAAQS		
DATE	MILESTONE	COMMENTS/SOURCE
November 11, 1990	Clean Air Act Amendments	
November 6, 1991	DFW four-county area designated “moderate” nonattainment.	Collin, Dallas, Denton, and Tarrant counties (56 FR 56694)
1993/1994	Texas Natural Resource Conservation Commission (TNRCC) submitted 15% Rate-of-Progress (ROP) State Implementation Plan (SIP) to EPA.	Phase I provided by TNRCC Phase II provided by TNRCC
September 21, 1994	TNRCC submitted “Moderate” Attainment Demonstration (AD) SIP to EPA.	AD SIP provided by TNRCC
November 28, 1994	EPA issued Final Rule to conditionally approve the NO _x Waiver (Section 182(f)).	Due to SIP focusing on VOC reductions only (59 FR 60709)
November 15, 1996	“Moderate” attainment date	DFW nonattainment area failed to meet NAAQS by this date
February 18, 1998	“Serious” nonattainment reclassification	Requires 9% ROP and AD SIP Effective Date: March 20, 1998 (63 FR 8128)
March 18, 1999	TNRCC submitted revised AD SIP to EPA.	AD SIP provided by TNRCC
June 2, 1999	EPA identified SIP administratively incomplete.	Starts 18-month sanction clock for mandatory application and a two-year sanction clock for a Federal Implementation Plan. Effective Date: May 13, 1999 (64 FR 29570)
October 15, 1999	TNRCC submitted 9% ROP technical correction to EPA.	9% ROP Technical Correction provided by TNRCC
November 15, 1999	Attainment date for “Serious” nonattainment areas.	DFW nonattainment area failed to meet NAAQS by this date.
April 25, 2000	TNRCC submitted AD SIP to EPA.	AD SIP provided by TNRCC
June 23, 2000	EPA determined AD SIP complete.	Begins EPA approval process (6-12 months) Stops sanction clock (EPA letter to Governor)
January 18, 2001	EPA proposed approval of DFW AD SIP.	60-day comment period ending March 19, 2001 (66 FR 4756)
March 18, 2003	Texas Commission on Environmental Quality (TCEQ) adopted AD SIP for the DFW nonattainment area.	AD SIP provided by TCEQ
January 14, 2004	TCEQ approved Transportation Control Measure Substitutions.	EPA concurrence on November 20, 2003 TCEQ Approval

Exhibit 2.2.2-3: North Central Texas Ozone Nonattainment Area Air Quality History (continued)

1-HOUR OZONE NAAQS		
DATE	MILESTONE	COMMENTS/SOURCE
April 30, 2004	EPA published final rule to revoke the 1-Hour Ozone NAAQS.	Effective one year (June 15, 2005) after an area is designated nonattainment for the 1997 8-Hour Ozone NAAQS (69 FR 23951)
April 22, 2005	EPA approved Memorandum of Agreement between TCEQ and North Central Texas Council of Governments providing emission offsets to the DFW International Airport.	Effective Date: May 23, 2005 (70 FR 20816)
June 15, 2005	Revocation of 1-Hour Ozone NAAQS for DFW nonattainment area.	Federal air quality commitments to reduce ozone are still in effect due to anti-backsliding rules
August 26, 2005	EPA approved DFW Voluntary Mobile Emission Reduction Program.	Effective Date: September 26, 2005 (70 FR 50208)
September 27, 2005	EPA approved Transportation Control measures in the DFW nonattainment area.	Effective Date: October 27, 2005 (70 FR 56374)
October 31, 2006	Region reached attainment of 1-Hour Ozone NAAQS.	
July 11, 2008	EPA proposed determination of attainment of revoked 1-Hour Ozone NAAQS for the DFW nonattainment area.	73 FR 39897
October 16, 2008	EPA published final rule determining attainment of revoked 1-Hour Ozone NAAQS for the DFW nonattainment area.	Suspends requirements for the area to submit AD, ROP, Reasonable Further Progress (RFP), and any other SIPs related to attainment of the 1-Hour Ozone NAAQS. Effective Date: November 17, 2008 (73 FR 61357)
November 8, 2016	EPA published final rule adopting the Redesignation Substitute Report, finding DFW region in attainment for the revoked 1-Hour and 1997 8-Hour Ozone NAAQS.	Effective Date: December 8, 2016 (81 FR 78668)
April 30, 2004	EPA promulgated Phase I ozone implementation rule and designated nine NCT counties as “moderate” nonattainment for the 1997 8-Hour Ozone NAAQS.	Nine counties: Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, and Tarrant Effective Date: June 15, 2004 (69 FR 23951)
April 27, 2005	TCEQ adopted the 5% Increment of Progress (IOP) Demonstration SIP.	Complete 5% IOP (provided by TCEQ)
November 22, 2005	EPA published direct final rule for the control of air pollution from new motor vehicles; revisions to motor vehicle diesel fuel sulfur transition provisions; and technical amendments to the highway diesel, non-road diesel, and Tier 2 gasoline programs.	Effective Date: January 6, 2006 (70 FR 70498)

Exhibit 2.2.2-3: North Central Texas Ozone Nonattainment Area Air Quality History (continued)

8-HOUR OZONE NAAQS		
DATE	MILESTONE	COMMENTS/SOURCE
November 29, 2005	EPA promulgated Phase II 8-hour implementation rule.	Includes Final Rule for Reformulated Gasoline Effective Date: January 30, 2006 (70 FR 71612)
August 22, 2006	EPA proposed approval of: <ul style="list-style-type: none"> • SIP revisions of DFW nonattainment area, satisfying 1-Hour Ozone NAAQS “serious” area requirements • 5% IOP • 2002 Base Year Inventory • 2007 Motor Vehicle Emission Budgets (MVEB) 	71 FR 48870
May 23, 2007	TCEQ adopted revisions to AD and RFP SIP, including 2008 MVEBs.	AD SIP Provided by the TCEQ RFP SIP Provided by the TCEQ
July 11, 2007	EPA proposed revisions to the 8-Hour Ozone NAAQS.	72 FR 37682
March 27, 2008	EPA published final rule revising 2008 8-Hour Ozone NAAQS.	New Standard is 75 ppb; secondary standards are identical to the revised primary standard Effective Date: May 27, 2008 (73 FR 16436)
January 14, 2009	EPA conditionally approved 1997 8-Hour Ozone AD SIP for DFW nonattainment area.	Effective Date: February 13, 2009 (74 FR 1903)
January 19, 2010	EPA proposed strengthening 2008 8-hour ozone primary standard from 75 ppb to within a range of 60 to 70 ppb, and a secondary standard to within a range of 7 to 15 parts per million (ppm)-hours.	(75 FR 2938)
June 15, 2010	“Moderate” nonattainment date for the 1997 8-Hour Ozone NAAQS.	DFW nonattainment area failed to meet NAAQS for 1997 8-Hour Ozone NAAQS.
July 15, 2010	EPA published final rule disapproving revisions to the New Source Review SIP; Flexible Permits.	Effective Date: August 16, 2010 75 FR 41311
August 9, 2010	EPA proposed reclassifying nine-county nonattainment area from “moderate” to “serious” for the 1997 8-Hour Ozone NAAQS.	75 FR 47746
December 20, 2010	EPA published final rule reclassifying the DFW area to “serious” nonattainment for the 1997 8-Hour Ozone NAAQS.	Effective Date: January 19, 2011 75 FR 79302

Exhibit 2.2.2-3: North Central Texas Ozone Nonattainment Area Air Quality History (continued)

8-HOUR OZONE NAAQS		
DATE	MILESTONE	COMMENTS/SOURCE
December 7, 2011	TCEQ adopted revisions to the 8-Hour Ozone AD SIP and RFP SIP for reclassification to “serious” nonattainment.	AD SIP provided by the TCEQ RFP SIP provided by the TCEQ
December 9, 2011	EPA proposed designation letter and technical support document for the 2008 8-Hour Ozone NAAQS.	US EPA Letter
January 11, 2012	TCEQ submitted comments regarding 2008 8-hour ozone designations.	TCEQ Letter
April 30, 2012	EPA’s final letter for 2008 8-hour ozone designations and classifications.	US EPA Letter
May 21, 2012	EPA published final rule designating 10 counties in NCT as “moderate” nonattainment. Established December 31 of each relevant calendar year as the attainment date for all nonattainment area classification categories.	10 Counties: Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, Tarrant, and Wise Effective Date: July 20, 2012 (77 FR 30160)
June 15, 2013	“Serious” nonattainment date for the 1997 8-Hour Ozone NAAQS.	DFW area failed to meet “serious” nonattainment date
December 17, 2014	EPA published proposed rule to strengthen 2008 8-Hour Ozone Primary NAAQS from 0.075 ppm to within a range between 0.065 to 0.070 ppm.	79 FR 75233
December 23, 2014	DC Court of Appeals published consent decree reversing EPA’s final rule establishing December 31 as the attainment date based on nonattainment area classification dates.	DC Court of Appeals Consent Decree
March 6, 2015	EPA published final rule implementing the 2008 8-Hour Ozone NAAQS and revoking the 1997 8-Hour Ozone NAAQS.	Effective Date: April 6, 2015 (80 FR 12263)
July 20, 2015	AD SIP submittal for 2008 8-Hour Ozone NAAQS due to EPA.	
September 1, 2015	EPA disapproved the 1997 8-Hour Ozone AD SIP and provided a Clean Data Determination for the nine counties designated nonattainment for the 1997 8-Hour Ozone NAAQS.	Effective Date: October 1, 2015 (80 FR 52630)
October 26, 2015	EPA published final rule revising 8-Hour Ozone NAAQS (2015 8-Hour Ozone NAAQS).	New standard is 0.070 ppm; secondary standards are identical to the revised primary standard Effective Date: December 28, 2015 (80 FR 65291)

Exhibit 2.2.2-3: North Central Texas Ozone Nonattainment Area Air Quality History (continued)

8-HOUR OZONE NAAQS		
DATE	MILESTONE	COMMENTS/SOURCE
November 8, 2016	EPA published final rule adopting the Redesignation Substitute SIP, finding the DFW region in attainment for the revoked 1-Hour and 1997 8-Hour Ozone NAAQS.	Effective Date: December 8, 2016 (81 FR 78668)
April 30, 2018	EPA signed final rule classifying nine counties in the DFW region as marginal nonattainment for the 2015 8-Hour Ozone NAAQS.	Marginal Counties: Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Tarrant, and Wise https://www.epa.gov/sites/production/files/2018-04/documents/placeholder.pdf
July 20, 2018	“Moderate” attainment deadline for the 2008 8-Hour Ozone NAAQS.	
August 23, 2019	EPA reclassified the 10-county nonattainment area from “moderate” to “serious.”	Effective Date: September 23, 2019 (84 FR 44238)
July 20, 2021	“Serious” attainment deadline for the 2008 8-Hour Ozone NAAQS.	
August 3, 2021	“Marginal” attainment deadline for the 2015 8-Hour Ozone NAAQS.	
April 13, 2022	EPA published determinations of attainment by the attainment date, extension of the attainment date, and reclassification of areas classified as serious for the 2008 Ozone NAAQS.	2022-07509.pdf (govinfo.gov)
April 13, 2022	EPA published determinations of attainment by the attainment date, extension of the attainment date, and reclassification of areas classified as serious for the 2015 Ozone NAAQS.	2022-07513.pdf (govinfo.gov)