Chapter 5

Future Air Quality

- **Without additional control measures, the South Coast Air Basin (Basin) will be unable to attain the 2015 8-hour ozone standard by the required deadline of 2037.**
- **To attain the standard, NOx emissions need to be reduced to 60.2 tons per day, which is 67 percent lower than the 2037 baseline.**
- **The control strategy discussed in Chapter 4 provides a path to attain the standard by 2037, with a design value at our highest monitoring site of 70.3 ppb.**
- **With the control strategy, all areas of the Basin are projected to attain the standard.**

In This Chapter

Introduction

The primary objective of the 2022 Air Quality Management Plan (AQMP) is to address attainment of the 2015 8-hour ozone standard of 70 parts per billion (ppb). Attainment strategies for the other ozone standards were discussed in the 2016 AQMP.

Air quality modeling to demonstrate future attainment of the ozone standard is an integral part of the planning process to achieve clean air. Modeling provides the means to relate emission reductions to air quality improvements through an attainment demonstration, which is the modeling exercise that shows the path to attainment. It reflects updated emissions estimates, new technical information, enhanced air quality modeling techniques, updated attainment demonstration methodology, and the control strategy.

The South Coast Air Quality Management District (South Coast AQMD)'s goal is to develop an attainment demonstration that: 1) ensures that ambient air quality standards for all criteria pollutants are met by the established deadlines in the federal Clean Air Act (CAA) and 2) achieves an expeditious rate of progress towards attaining the air quality standards. The overall control strategy is designed such that efforts to achieve the standard for one criteria pollutant complements efforts to meet the standards for other pollutants.

Base Design Values

The trend of the South Coast Air Basin (Basin) ozone design values is presented in Figure 5-1. Both 8-hour and 1-hour ozone design values have decreased over the 30-year period, although concentrations have increased in the last few years due to adverse meteorology. The current 8-hour design value, 114 ppb based on 2019-2021 data, continues to exceed the 1997 8-hour ozone standard (80 ppb) by 43 percent, the 2008 ozone standard (75 ppb) by 52 percent, and the 2015 ozone standard (70 ppb) by 63 percent. In addition, the most recent 1-hour design value of 167 ppb exceeds the 1979 1-hour ozone standard (120 ppb) by 39 percent. Refer to Chapter 2 of this report for details.

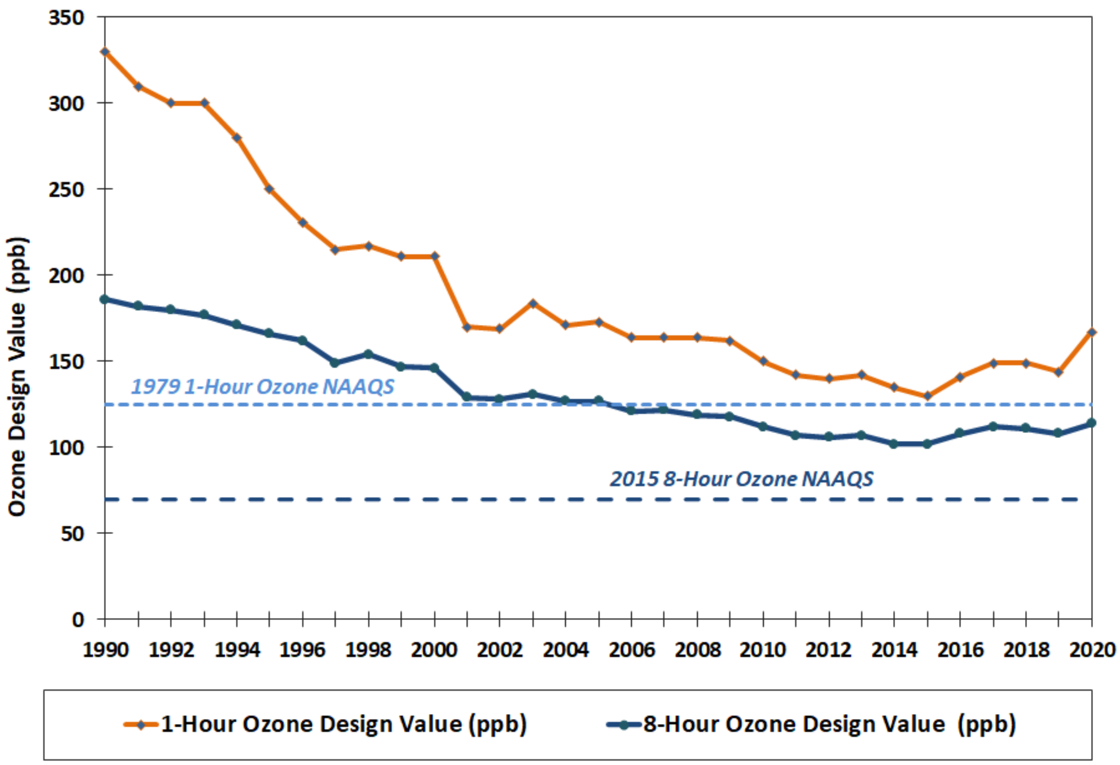

FIGURE 5-1

SOUTH COAST AIR BASIN OZONE DESIGN VALUES

(*EACH 8-HOUR VALUE REPRESENTS THE 3-YEAR AVERAGE OF THE ANNUAL FOURTH HIGHEST 8-HOUR AVERAGE OZONE CONCENTRATION. THE 1-HOUR VALUES REPRESENT THE FOURTH HIGHEST 1-HOUR OZONE OVER A 3-YEAR PERIOD*)

The United States Environmental Protection Agency (U.S. EPA) guidance[1] for attainment demonstrations recommends the use of multiple year averages of design values, where appropriate, to dampen the effects of single year anomalies in the air quality trend due to factors such as adverse or favorable meteorology or radical changes in the local emissions profile. The attainment demonstration therefore employs 5-year weighted design values, which were calculated by averaging the U.S. EPA's published design values for 2017, 2018, and 2019. Since each design value represents a 3-year average of the fourth highest measured ozone, the 5-year design values incorporate measurements between 2015 and 2019. The design values were centered on 2017 to discard the anomalies caused by the effects of COVID on emissions and resulting air quality in 2020. Table 5-1 lists the 5-year design values and compares these values to those in the 2016 AQMP, where available. The higher design values in the 2022 AQMP compared to those in the 2016 AQMP reflect the adverse meteorology experienced during the 2015-2019 base design value period.

[1] U.S. EPA (2018) Modeling Guidance for Demonstrating Air Quality Goals for Ozone, PM2.5, and Regional Haze. Available at: https://www.epa.gov/sites/default/files/2020-10/documents/o3-pm-rh-modeling_guidance-2018.pdf.

TABLE 5-1
FIVE-YEAR WEIGHTED DESIGN VALUES IN THE 2016 AND 2022 AQMPS

Station*	2016 AQMP 5-Year Weighted Design Value (ppb)	2022 AQMP 5-Year Weighted Design Value (ppb)
Azusa	79.3	97.6
Banning	95.3	97.0
Crestline	103.0	110.3
Fontana	101.0	98.3
Glendora	92.7	102.3
La Habra	N/A	75.6
Los Angeles	N/A	73.3
Lake Elsinore	85.3	89.0
Mira Loma	92.7	97.3
Mission Viejo	N/A	78.3
Pasadena	N/A	86.3
Perris	91.0	93.0
Pico Rivera	N/A	75.3
Pomona	84.3	91.3
Redlands	104.7	106.3
Reseda	89.0	90.3
Rubidoux	96.3	97.3
San Bernardino	98.0	110.0
Santa Clarita	97.3	99.3
Temecula	N/A	79.6
Upland	96.7	107.0

*Stations having design values greater than 70 ppb and meeting data completeness criteria

Ozone Modeling Approach

The approach used in this AQMP is similar to the approach used in the 2016 AQMP and is consistent with the U.S. EPA guidance (U.S. EPA, 2018).[2] Air quality simulations using the Community Multiscale Air Quality (CMAQ) model were conducted for each hour in the 2018 ozone season (May 1st to September 30th).

Meteorology, Emissions, and Model Configuration

The emissions inventory and meteorological conditions were developed for 2018 as the base year. This differs from the base design value period, which was centered on 2017. The year 2018 was selected as the base year for emissions and meteorology because that was the year of designation of the Basin as an "extreme" non-attainment area. In addition, the Multiple Air Toxics Exposure Study V (MATES V)[3] was conducted during 2018 and involved a comprehensive campaign of monitoring and modeling that allowed for the development of a robust and extensively validated modeling framework.

The 2022 AQMP ozone attainment demonstration framework is an upgrade from the modeling platform used in the 2016 AQMP and more recent SIP revisions. It is built using the U.S. EPA-supported CMAQ (version 5.2.1) modeling platform with Statewide Air Pollution Research Center (SAPRC) 07 chemistry, and the Weather Research and Forecasting Model (WRF) meteorological fields. The modeling platform tracks primary pollutants directly emitted that includes precursors of ozone and particulate matter (PM2.5) and the formation of secondary pollutants like ozone and particles formed from the chemical reactions that occur in the atmosphere. The ozone attainment demonstration focused on the period from May through September. The simulations were conducted over an area with a western boundary over 100 miles west of the Ports of Los Angeles and Long Beach. The eastern boundary extends slightly beyond the Colorado River while the northern and southern boundaries of the domain extend to the San Joaquin Valley and the Northern portions of Mexico, respectively. CMAQ was simulated with a 4-kilometer grid resolution.

For the 2022 AQMP, WRF was updated to the most recent version (4.0.3) available at the time of protocol preparation. The WRF simulations were initialized using National Centers for Environmental Prediction (NCEP) re-analysis data[4] and run for three-day increments with four-dimensional data assimilation (FDDA). Prior to completion of the 2022 AQMP, a more recent version of WRF (4.3) was tested and confirmed to produce similar results as the WRF model employed in this analysis. Details on the meteorological setup and the specific physics options used in the meteorological projections are described in Appendix V.

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[2] https://www.epa.gov/sites/default/files/2020-10/documents/o3-pm-rh-modeling_guidance-2018.pdf.

[3] http://www.aqmd.gov/docs/default-source/planning/mates-v/mates-v-final-report-9-24-21.pdf?sfvrsn=6.

[4] NCEP Reanalysis data provided by the NOAA/OAR/ESRL PSL, Boulder, Colorado, USA, from their Web site at: https://psl.noaa.gov/data/gridded/data.narr.html.

Point source emissions were extracted from the South Coast AQMD's Annual Emissions Reporting Program[5] and allocated to a specific day of a year using temporal allocation factors developed by CARB.[6] On-road mobile source emissions were calculated using CARB's EMFAC2017 emissions model, with vehicle travel activity data provided by Southern California Association of Governments (SCAG). Vehicle emissions accounted for meteorological effects on operational and evaporative emissions (temperature and relative humidity effects) which were derived from daily WRF-derived meteorological variables. In addition, hourly vehicle activity profiles based on the California Department of Transportation (Caltrans) Performance Measurement System (PeMS) were used to refine the temporal variation of vehicle emissions. Spatial and temporal allocation of emissions from area sources and most off-road emissions sources were calculated using the latest update in spatial and temporal surrogates developed by CARB and released in January 2021. In addition, ocean-going vessel emissions were spatially allocated using data from the Automated Identification System (AIS), and aircraft emissions from major airports in the basin were allocated using data derived from the Aircraft Communication Addressing and Reporting System (ACARS). Gridded hourly biogenic emissions were calculated using the Model of Emissions of Gases and Aerosols from Nature version 3.0 (MEGAN3.0), which required meteorological inputs from WRF. Detailed information on the modeling approach, data retrieval, model development and enhancement, model application, emissions inventory development, and interpretation of results is presented in Appendix V.

Ozone Representativeness

Figure 5-2 depicts the observed maximum daily average 8-hour (MDA8) ozone levels Basin-wide and at Crestline and Redlands during the 2018 ozone season. Crestline is depicted as it exhibits the highest base design value and Redlands is shown since it was the site with the highest base design value in the 2016 AQMP. During this period, several well-defined multi-day ozone episodes occurred in the Basin, with 122 days having daily maximum concentrations of 70 ppb or higher. Redlands exhibited the highest ozone design value (104.7 ppb) for 2010-2014, the 5-year base design value period in the 2016 AQMP. However, Crestline showed the highest base design value (110.3 ppb) for the 5-year period in the current analysis. Stations located in San Bernardino and Riverside counties show similar levels of elevated ozone as Crestline and Redlands, highlighting the influence of similar transport and chemistry patterns.

[5] https://www.aqmd.gov/home/rules-compliance/compliance/annual-emission-reporting.

[6] California Emission Inventory Database and Reporting System (CEIDARS) 2018.

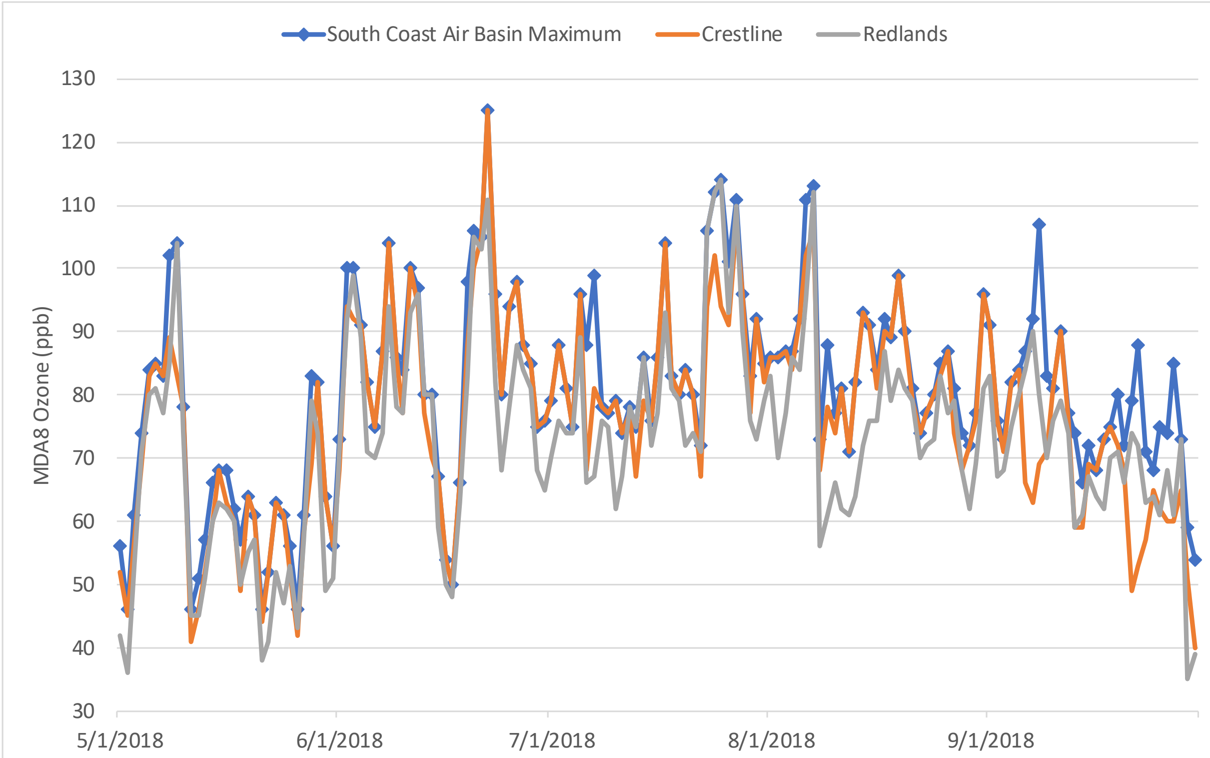

FIGURE 5-2
OBSERVED BASIN, REDLANDS, AND CRESTLINE MAXIMUM DAILY AVERAGE 8-HOUR OZONE CONCENTRATIONS: MAY 1 THROUGH SEPT 30, 2018

Design Values and Relative Response Factors (RRF)

To bridge the gap between air quality model predictions and measurements, the U.S. EPA recommends the use of relative response factors (RRFs). In this approach, future year concentration predictions require two elements: base year design values and RRFs. The RRF is simply a ratio of the future year predicted air quality to the simulated air quality in the base year, representing the model-predicted change in air quality in response to predicted emissions changes. Only the top 10 days were used to calculate the RRF provided that modeled maximum daily average 8-hour ozone exceeded 60 ppb, a requirement satisfied at all monitoring sites in the current analysis. The same top 10 dates in the base corresponded to those in the future year and the maximum modeled value in the 3 by 3 grid surrounding each station is compared to the corresponding grid position in the future year. Future year concentrations are estimated by multiplying the non-dimensional RRF by the base year design value, thus applying the model-predicted change in air quality directly to the measured concentrations in the base year. Assuming any potential modeling biases are similar in the base and future years, the RRF approach acts to minimize their impact on predictions.

Model Performance

The U.S. EPA recommends an operational evaluation to assess how accurately the model predicts observed concentrations. The basis for this recommendation is that if the model can characterize base year ozone, then greater confidence can be placed in the model-prediction of future concentrations.

Figure 5-3 depicts the modeled and measured maximum daily average 8-hour (MDA8) ozone concentrations at Crestline and Redlands during the 2018 ozone season. The Basin maximum ozone concentration is also depicted. These data demonstrate that the model captures high ozone episodes, which suggests reasonable model performance especially for the top 10 days that are used in the RRF. A comprehensive model performance evaluation is presented in Appendix V.

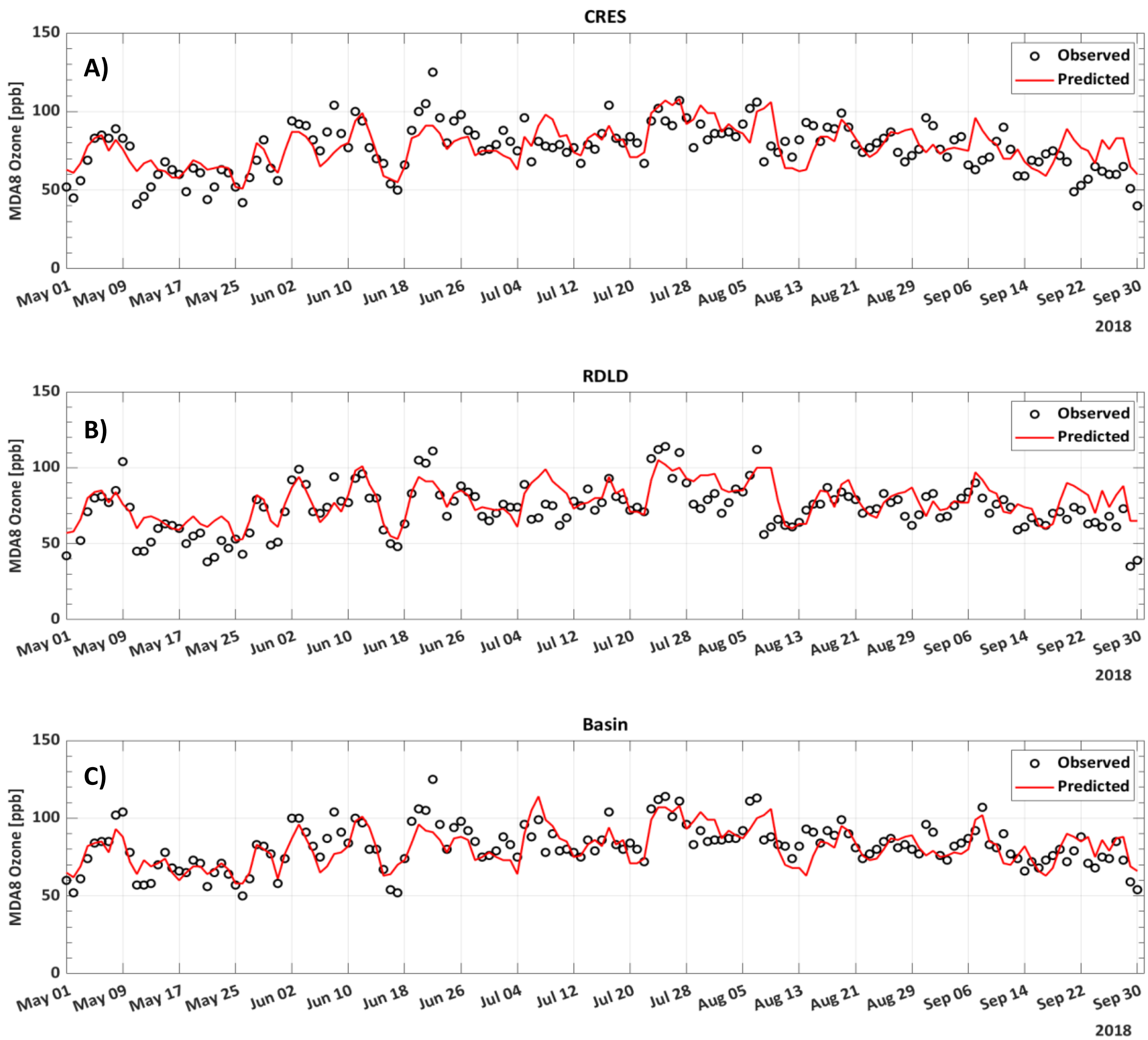

FIGURE 5-3

MODELED AND OBSERVED CRESTLINE (A), REDLANDS (B), AND BASIN (C) MAXIMUM DAILY AVERAGE A) 8-HOUR (MDA8) OZONE CONCENTRATIONS: MAY 1 THROUGH SEPT 30, 2018

Future Ozone Air Quality

Future 8-hour ozone design values, adjusted by the RRF, were estimated for the 2037 baseline and the 2037 control cases. The baseline represents the level of emissions with no additional reductions beyond adopted measures, while the control case contains additional emission reductions proposed in this AQMP to reach attainment. Both the Basin-maximum predicted ozone level (future design value) and spatial distribution of the future ozone levels are presented.

Ozone Isopleths

To estimate the amount of reductions required to meet the standard, a series of ozone simulations with varying VOC and NOx emissions were conducted. The first simulation corresponds to the baseline emissions, while each subsequent simulation incrementally reduces either VOC, NOx, or both. The final simulation contains zero anthropogenic emissions. This results in approximately 48 total ozone season simulations, which require extensive computational resources. The results are then plotted as isopleths for each station and are included in Appendix V Attachment 4. The isopleths approximate the expected ozone design value for a given level of VOC and NOx emissions. Thus, the isopleths can be used to guide the attainment strategy. The isopleth for Glendora (GLEN), the site with the highest predicted design value in the attainment scenario, is depicted in Figure 5-4. The NOx and VOC emissions correspond to the Basin total. Attainment occurs for design values less than or equal to 70.9 ppb, which is denoted by the white contour in the isopleth. With VOC emissions greater than 300 tons per day, the corresponding NOx emissions along the white contour are approximately 60-70 tons per day. The isopleth further demonstrates that VOC reductions alone are insufficient to demonstrate attainment.

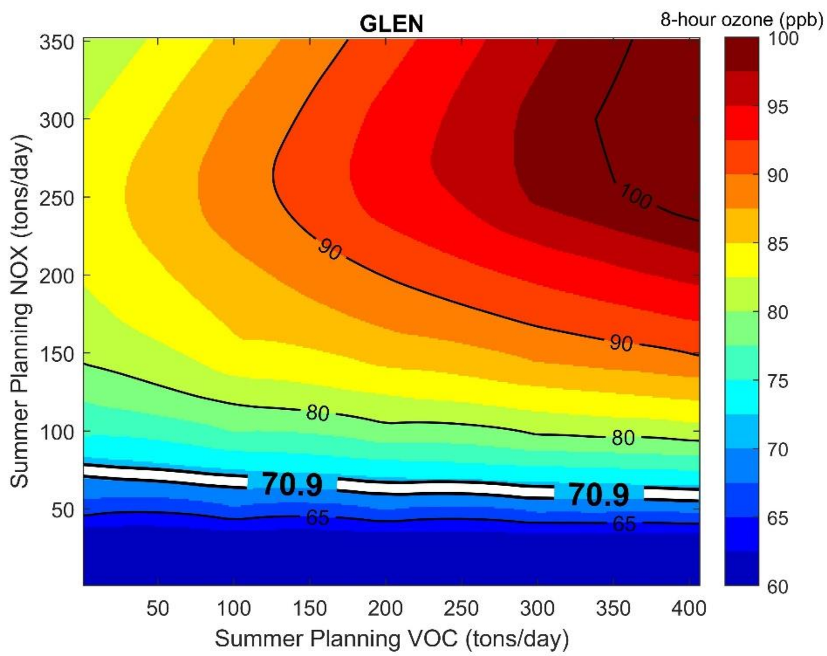

FIGURE 5-4
ISOPLETH FOR GLENDORA DEPICTING BASIN TOTAL NOX AND VOC EMISSIONS AND CORRESPONDING OZONE DESIGN VALUE

8-Hour Ozone Attainment

While the isopleths serve as a useful guide to visualize the pathway to attainment, they only provide a rough estimate of the required NOx reductions. To provide a more accurate estimate, the emissions used in the attainment demonstration are based on implementation of the control strategy, which is based on need, feasibility, affordability, and other factors associated with each source category. This results in a more accurate estimation of the carrying capacity, the maximum allowable NOx emissions to meet the ozone standard.

The 2037 baseline scenario was first explored to determine whether attainment would be achieved through the implementation of adopted regulations and programs. The 2037 baseline (184 tons per day) includes 167 tons per day of NOx reductions beyond the 2018 baseline (351 tons per day). As shown in Table 5-2, Crestline remains the site with the highest design value (93.4 ppb) in the baseline scenario. In addition to Crestline, multiple sites also exceed the 2015 8-hour ozone standard. Thus, the baseline scenario fails to demonstrate attainment, indicating that additional emission reductions are necessary to meet the standard.

A series of simulations with category-specific emission reductions were conducted to pinpoint the carrying capacity. Based on these simulations, the carrying capacity is estimated to be 60.2 tons per day NOx in 2037. This is equivalent to an additional 67 percent reduction from the 2037 baseline NOx emissions. The attainment scenario reflects the overall 67 percent reduction and relied on a 60 percent reduction from all stationary source categories, 61 percent from on-road mobile, and 72 percent from other mobile sources. Table 5-3 summarizes the emission reductions reflected in the attainment scenario. The attainment scenario also includes Further Deployment of Cleaner Technologies NOx reductions of 3 tons per day for stationary sources and 0.5 tons per day for SIP reserve for potential technology assessments. Detailed descriptions of control measures and expected reductions for each measure are provided in Chapter 4 and Appendix IV. These reductions will ensure attainment of the 2015 federal 8-hour standard in 2037 at all stations, with a maximum design value of 70.3 ppb in Glendora.

TABLE 5-2
MODEL-PREDICTED 8-HOUR OZONE DESIGN VALUES (PPB)

Station	2037 Baseline	2037 Controlled
Azusa	90.3	68.8
Banning	79.7	60.6
Crestline	93.4	67.0
Fontana	85.0	61.9
Glendora	93.3	70.3
La Habra	72.4	59.2
Los Angeles	73.5	63.4
Lake Elsinore	72.4	55.2
Mira Loma	84.0	63.8
Mission Viejo	74.8	61.9
Pasadena	81.8	64.6
Perris	76.0	57.7
Pico Rivera	74.2	60.4
Pomona	80.6	59.3
Redlands	89.2	65.3
Reseda	81.8	64.5
Rubidoux	83.7	63.6
San Bernardino	93.2	67.3
Santa Clarita	85.0	63.8
Temecula	69.3	59.7
Upland	80.6	68.1

TABLE 5-3
SUMMARY OF CATEGORY-SPECIFIC NOX EMISSION REDUCTIONS (TONS PER DAY) FROM CARB AND SOUTH COAST CONTROL MEASURES IN THE ATTAINMENT SCENARIO IN 2037[1]

Control Measure	NOx Baseline	NOx Reduction	Category Remaining NOx
South Coast AQMD stationary measures[1]	41.3	22.4	18.9
CARB Passenger Vehicles/Motorcycle measures	15.3	5.8	9.5
CARB Medium-Duty Vehicles measures	1.4	0.0	1.4
CARB Heavy-Duty Vehicles measures	20.1	14.5	5.6
CARB Locomotive measures	15.4	10.9	2.7
CARB Ocean Going Vessels (OGV) measures	30.7	24.5	6.2
CARB Off-Road Equipment measures	23.6	14.5	9.1
CARB Commercial Harbor Craft measures	5.4	2.6	2.8
CARB Recreational Boast measures	3.3	0.3	3.0
CARB Aircraft measures	27.9	19.4	8.5
Total CARB and South Coast AQMD Measures	**184.5**	**114.9**	**69.5**
South Coast AQMD MOB-05 incentive program[3]	N/A	0.1	N/A
South Coast AQMD MOB-11 incentive program[4]	N/A	6.7	N/A
Further Deployment of Cleaner Technologies (Stationary Sources)	N/A	3	N/A
Set-Aside Accounts[5]	N/A	-0.5	N/A
Total (All Measures)	**184.5**	**124.3**	**60.2**

[1] Details of South Coast AQMD stationary measures estimated reduction in 2037 can be found in Table 4.

[2] Count 3.2 tons per day as the combined reduction from CARB and South Coast AQMD measures for Zero Emission building, for South Coast AQMD measures C-CMB-01, C-CMB-02, R-CMB-01 and R-CMB-02, the reduction is 2.87 tons per day. See detail in Chapter 4 Table 4-2.

[3] Estimated reductions from Accelerated Retirement of Older Light-Duty and Medium-Duty Vehicles.

[4] Estimated reductions from mobile sources with Emission Reductions from Incentive Programs. See detail in Chapter 4 Table 4-20.

[5] 0.5 tons per day NOx emission in 2037 for SIP reserve for potential technology assessments, see detail in Appendix III.

Discussion

Between 2018 and 2037, the baseline NOx emissions decline by 167 tons per day (tpd), yet the design value will only decrease by 17 ppb (17 ppb/167 tpd = 0.10 ppb/tpd). However, the controlled emissions scenario results in an additional 124 tons per day of NOx reductions beyond the 2037 baseline which reduces the ozone design value by 23 ppb (23 ppb/124 tpd = 0.19 ppb/tpd). Thus, the rate of ozone decrease in response to an equivalent reduction of NOx is expected to increase by nearly a factor of two. This is consistent with the expected response based on the Glendora isopleth shown in Figure 5-4, the benefit of NOx reductions accelerating as the Basin progresses toward a NOx lean condition. In addition, recent observations of the ozone weekend effect support the increasing importance of continued NOx reductions as the most effective strategy for attainment.

A weekend effect, typically experienced in urban areas, results from reduced NOx emissions on weekends leading to higher ozone and consequently a greater fraction of weekend days exceeding the standard. However, sufficient NOx reductions with concurrent VOC reductions will alleviate the weekend effect and eventually lead to lower ozone levels on weekends compared to weekdays.

Table 5-4 lists the number of weekend days and weekdays exceeding the 2015 8-hour ozone standard during the 2018 ozone season for stations that meet U.S. EPA’s data completeness requirement and have design values greater than 70 ppb. Table 5-5 compares the ratio of weekday to weekend exceedance days in 2018 to those in 2012, the base year for the 2016 AQMP. Note that the 2012 analysis counted days exceeding 75 ppb, whereas the 2018 analysis counts days exceeding 70 ppb. The ratio increased in 2018 compared to 2012, indicating that ozone exceedances are increasingly likely on weekdays rather than on weekends. This is evidence that the weekend effect is diminishing and that the Basin is progressing towards NOx-limited ozone formation and will therefore benefit from the NOx control strategy. Overall, ozone responsiveness to NOx reductions as illustrated by the diminishing weekend effect and ozone isopleth provides supplemental evidence that sufficient NOx emission reductions will ensure attainment of the 2015 8-hour ozone standard. Further details on this analysis are presented in Appendix V as part of the weight of evidence discussion.

TABLE 5-4
FIVE-YEAR WEIGHTED DESIGN VALUES AND NUMBER OF DAYS DAILY MAXIMUM CONCENTRATIONS EXCEEDED 70 PPB DURING 2018 OZONE SEASON

Station*	2015-2019 Weighted Design Value (ppb)	Number Of Weekend Days In 2018 With Observed daily max 8-hour Ozone > 70 ppb	Number Of Weekday Days In 2018 With Observed daily max 8-hour Ozone > 70 ppb
Azusa	97.6	17	21
Banning	97.0	14	47
Crestline	110.3	28	72
Fontana	98.3	23	44
Glendora	102.3	18	26
La Habra	75.6	1	3
Los Angeles	73.3	2	2
Lake Elsinore	89.0	4	25
Mira Loma	97.3	14	40
Mission Viejo	78.3	2	4
Pasadena	86.3	9	8
Perris	93.0	16	48
Pico Rivera	75.3	2	3
Pomona	91.3	2	8
Redlands	106.3	23	67
Reseda	90.3	10	32
Rubidoux	97.3	13	37
San Bernardino	110.0	28	67
Santa Clarita	99.3	15	37
Temecula	79.6	5	8
Upland	107.0	17	32

*Stations having design values greater than 70 ppb and meeting data completeness criteria

TABLE 5-5
COMPARISON OF WEEKDAY TO WEEKEND OZONE EXCEEDANCES IN 2012 AND 2018

Station*	2012 Ratio (Weekday:Weekend)	2018 Ratio (Weekday:Weekend)	Change (2018-2012)
Azusa	0.22	1.24	1.01
Banning	2.14	3.36	1.21
Crestline	1.97	2.57	0.60
Fontana	0.86	1.91	1.06
Glendora	0.62	1.44	0.82
Lake Elsinore	1.83	6.25	4.42
Mira Loma	1.21	2.86	1.65
Perris	1.88	3.00	1.12
Pomona	0.42	4.00	3.58
Redlands	1.43	2.91	1.48
Reseda	1.55	3.20	1.65
Rubidoux	1.21	2.85	1.64
San Bernardino	0.97	2.39	1.43
Santa Clarita	1.07	2.47	1.40
Upland	0.96	1.88	0.92

*Only stations included in the 2016 AQMP analysis are presented here

Spatial Projections of 8-Hour Ozone Design Values

The spatial distribution of ozone design values for the 2018 base year is shown in Figure 5-5. Currently, the San Bernardino foothills and mountains are the areas with the highest ozone in the Basin. Projected 8-hour ozone design values for 2037 with and without implementation of all proposed control measures are presented in Figures 5-6 through 5-7. Although many areas experience lower ozone under the 2037 baseline condition, large portions of the eastern Basin remain unhealthy. The predicted ozone concentrations will be significantly reduced in future years in all parts of the Basin with the proposed control measures. The NOx emission reductions listed in Chapter 4 are expected to ensure attainment of the 2015 8-hour ozone standard at every monitoring station in the Basin. An unmonitored area analysis, presented in detail in Appendix V, was conducted to confirm attainment in all areas of the Basin.

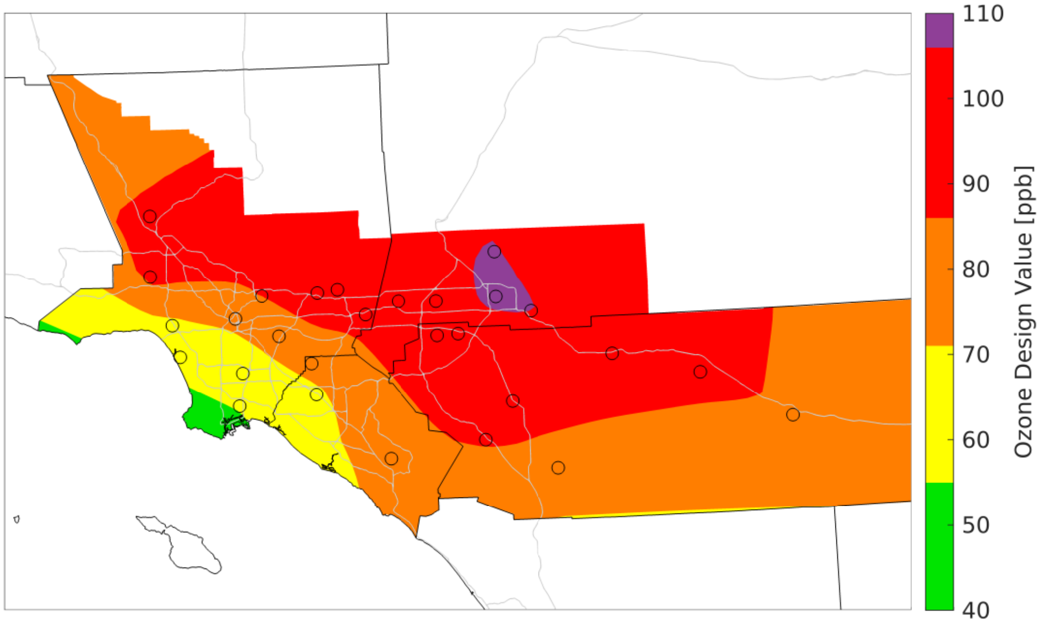

FIGURE 5-5
INTERPOLATED 5-YEAR WEIGHTED 8-HOUR OZONE DESIGN VALUES (PPB) FOR 2018
(VALUES ARE COLOR-CODED TO CORRESPOND TO THE 2015 70 PPB AIR QUALITY INDEX)

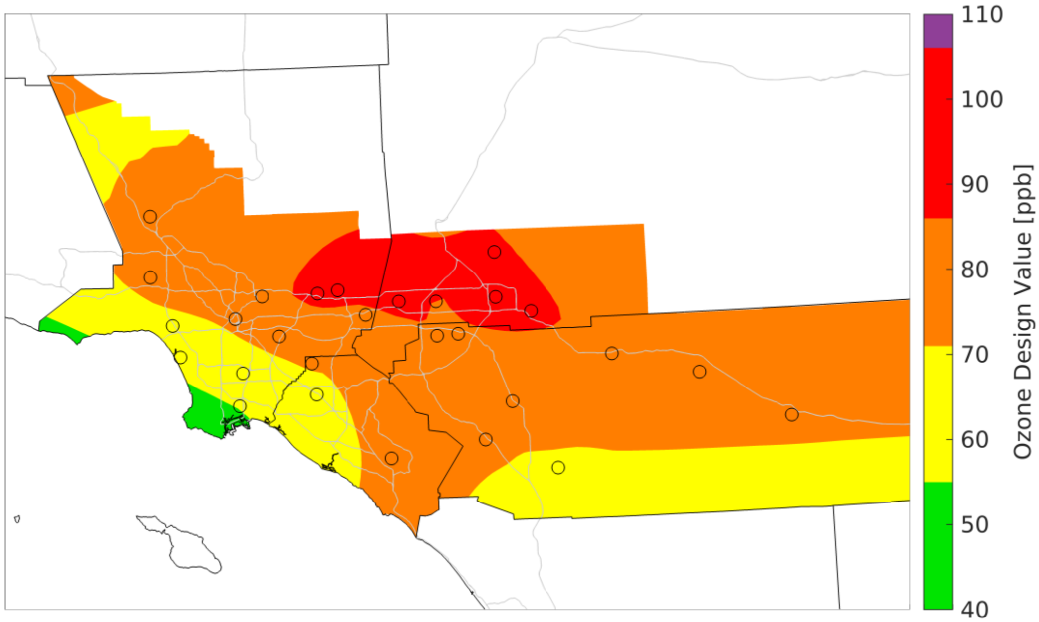

FIGURE 5-6
INTERPOLATED 2037 BASELINE 8-HOUR OZONE CONCENTRATIONS (PPB)
(VALUES ARE COLOR-CODED TO CORRESPOND TO THE 2015 70 PPB AIR QUALITY INDEX)

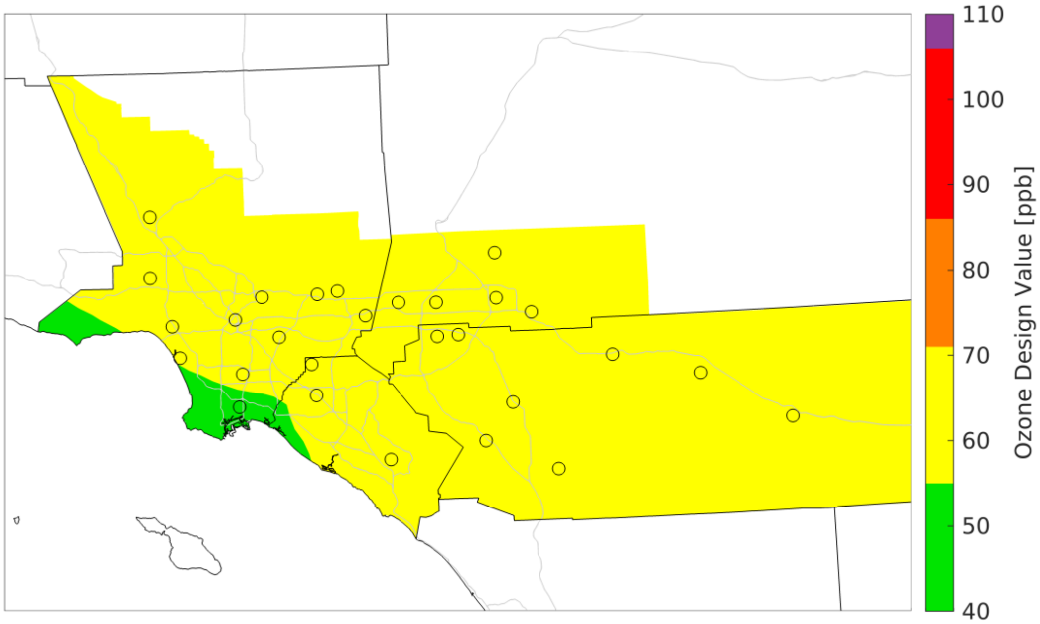

FIGURE 5-7
INTERPOLATED 2037 CONTROLLED 8-HOUR OZONE CONCENTRATIONS (PPB)
(VALUES ARE COLOR-CODED TO CORRESPOND TO THE 2015 70 PPB AIR QUALITY INDEX)

Summary and Conclusions

Figure 5-8 shows the Basin-wide maximum 5-year weighted ozone base design value along with the projected design value for the attainment deadline of the 2015 8-hour federal standard (2037). Approximately 124 tons per day of NOx reductions from the 2037 baseline are needed to meet the 8-hour ozone standard in 2037 (see Figure 5-9). This equates to an approximately 67 percent reduction from the 2037 baseline (see Figure 5-10). With the controls proposed in this AQMP, future ozone concentrations are expected to meet the federal 2015 8-hour ozone standard by 2037.

California Ambient Air Quality Standards (CAAQS) are distinct from NAAQS. The current 8-hour and 1-hour ozone CAAQS are 70 ppb and 90 ppb, respectively. CAAQS are based on designation values, while NAAQS are based on design values. Due to the stringency of the CAAQS designation values, attainment is not anticipated in 2037 for either the 8-hour or 1-hour standard. Further emission reductions and additional time will be required to attain the CAAQS. A detailed analysis is presented in Appendix V.

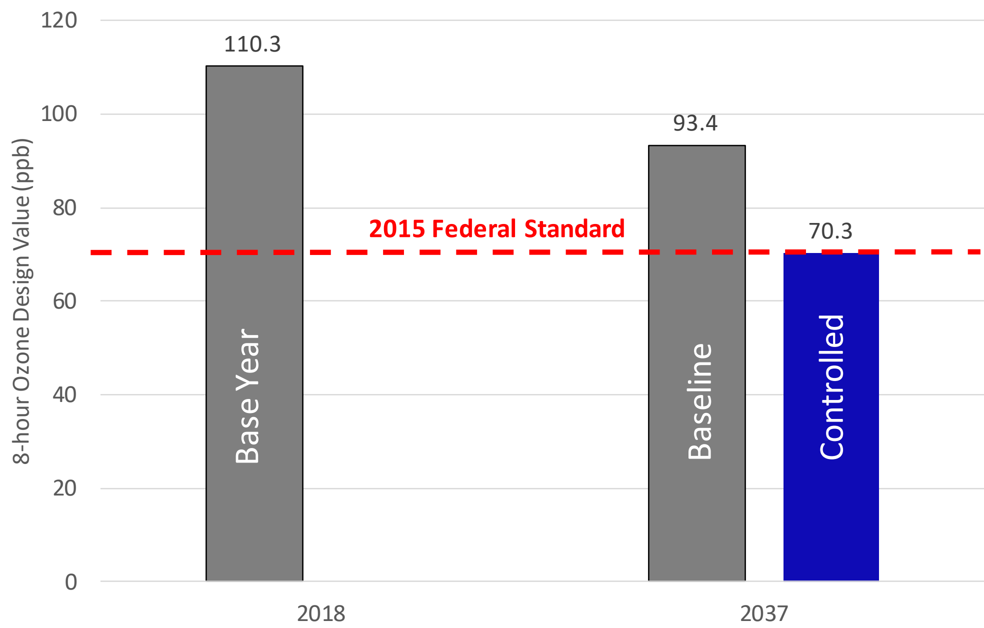

FIGURE 5-8
PROJECTION OF FUTURE 8-HOUR OZONE AIR QUALITY IN THE BASIN IN COMPARISON TO FEDERAL STANDARDS

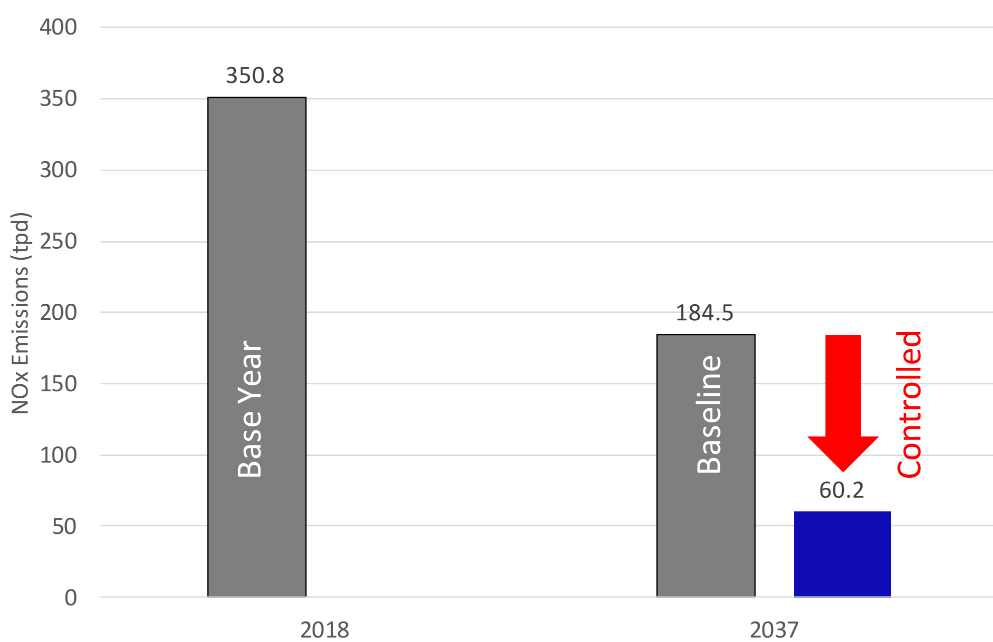

FIGURE 5-9
BASELINE AND FUTURE NOX EMISSION INVENTORIES IN THE BASIN

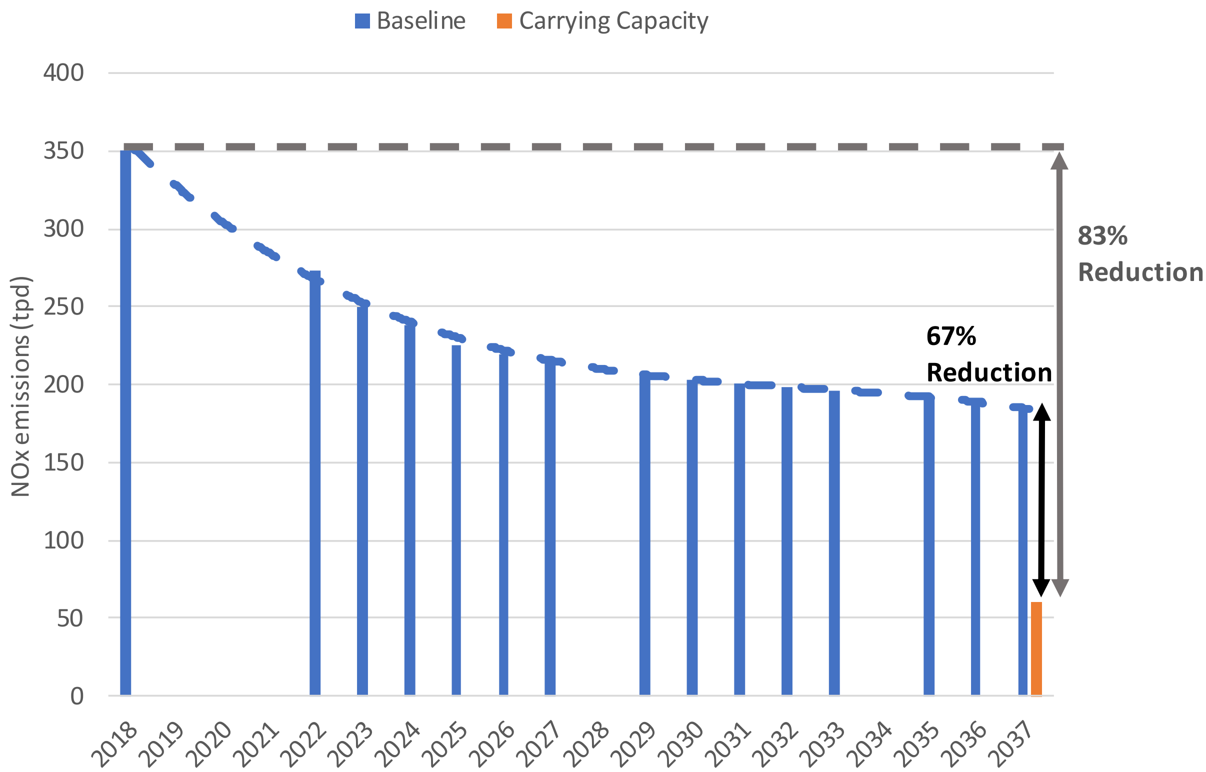

FIGURE 5-10
SUMMER PLANNING BASELINE EMISSIONS AND OZONE CARRYING CAPACITY