

# Fifty-Third Quarterly Report of Ambient Air Quality Monitoring at Sunshine Canyon Landfill and Van Gogh Elementary School

December 1, 2020 – February 28, 2021

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Quarterly Report

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# Executive Summary

## Background

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Continuous monitoring of meteorological and air quality parameters began at the Sunshine Canyon Landfill (Landfill site) and at Van Gogh Elementary School (Community site) in the nearby community of Granada Hills in fall 2007. At these sites, the following are measured: particulate matter less than 10 microns in aerodynamic diameter (PM<sub>10</sub>), wind speed (WS) and wind direction (WD), and black carbon (BC) as a surrogate for diesel particulate matter (DPM). The collected data are validated and evaluated for completeness quarterly. Monitoring is conducted to fulfill stipulations in the City of Los Angeles' Conditions of Approval for the expansion of the landfill.<sup>1</sup> Similar conditions cover the County of Los Angeles' portion of the landfill.<sup>2</sup>

PM<sub>10</sub> concentrations are compared with federal and state PM<sub>10</sub> standards. When PM<sub>10</sub> concentrations are above the standard (i.e., an exceedance), additional comparisons are made with the historical, regional, and annual ambient PM<sub>10</sub> concentrations. The PM<sub>10</sub> and BC data are analyzed annually to characterize the impact of landfill operations on ambient air quality as observed at the Community site by quantifying PM<sub>10</sub> and BC concentrations and exceedances and comparing concentrations between the Landfill and Community sites. A more in-depth analysis is performed for the annual report.

The validated hourly data and a summary of the analytical results and field operations are reported to the Planning Department of the City of Los Angeles and to the Los Angeles County Department of Regional Planning. This Fifty-Third Quarterly Report summarizes the December 2020–February 2021 (2021 winter quarter) monitoring results from the fourteenth year of continuous data collection.

## Statistics

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For this quarter, the percent data capture for hourly PM<sub>10</sub> was 100.0% at both the Landfill site and the Community site. Of the captured PM<sub>10</sub> data, approximately 11.3% were invalidated at the Landfill site and approximately 2.9% were invalidated at the Community site. None of the PM<sub>10</sub> data were deemed suspect at either the Landfill site or the Community site.

Hourly BC data capture was 100.0% at the Landfill site and 99.1% at the Community site. Of the captured hourly BC data, no data were deemed invalid at either the Landfill site or the Community

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<sup>1</sup> Section C.10.a of Ordinance No. 172,933.

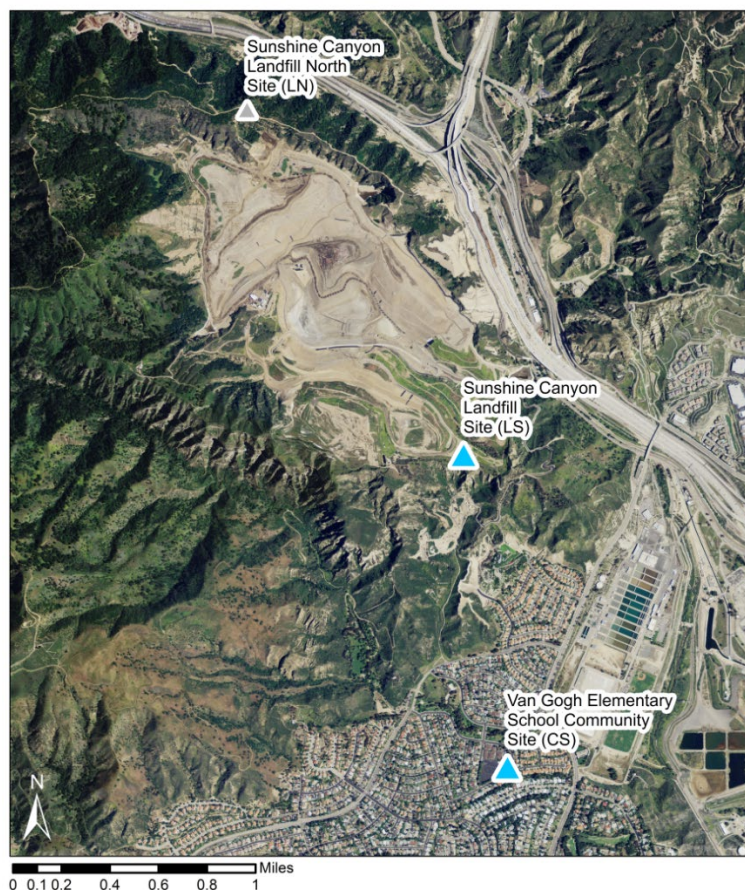
<sup>2</sup> County Condition 81.

site. Of the captured hourly BC data, approximately 2.2% were deemed suspect at the Landfill site and 4.7% were deemed suspect at the Community site.

During this quarter, the state 24-hr PM<sub>10</sub> standard (50 µg/m<sup>3</sup>) was exceeded on 32% of days (24 days out of the valid 76 days of the quarter) at the Landfill site and 4% of days at the Community site (3 days out of the valid 87 days of the quarter). The federal 24-hr PM<sub>10</sub> standard (150 µg/m<sup>3</sup>) was exceeded on 6% of days (4 days out of the valid 76 days of the quarter) at the Landfill site, but no federal exceedance was observed at the Community site for this quarter. In the winter 2021 quarter, the 24-hr average BC concentration was approximately 0.4 µg/m<sup>3</sup> at the Landfill site and 0.3 µg/m<sup>3</sup> at the Community site. Both sites exhibited ranges of 24-hr average BC concentrations on the low end among the 14 monitored winter quarters (2008–2021).

# 1. Introduction

This report summarizes data completeness, ambient particulate matter less than 10 microns in aerodynamic diameter ( $PM_{10}$ ) concentrations, average and maximum ambient black carbon (BC, a surrogate for diesel particulate matter [DPM] concentrations), instrument flow rate verification (quality control) data, and field operations for the quarterly period of December 1, 2020, through February 28, 2021. The collected data are validated and evaluated quarterly for completeness. This is the fourteenth year that continuous data were collected in the winter from continuous monitors at the Sunshine Canyon Landfill site (LS; previously called the Berm site) and the Van Gogh Elementary School Community site (CS). The monitoring site locations are shown in [Figure 1](#).  $PM_{10}$  is measured with a beta attenuation monitor (BAM), and BC is measured with an Aethalometer. The Sunshine Canyon Landfill North (LN) monitoring site shown in Figure 1 was installed in December 2015 and decommissioned on May 31, 2017.



**Figure 1.** View of Sunshine Canyon Landfill and the surrounding monitoring stations (blue triangles): Sunshine Canyon Landfill site (LS) and Community site (CS). The Sunshine Canyon Landfill North site (LN, gray triangle) collected data from December 1, 2015, through May 31, 2017, and has since been decommissioned.

Monitoring is conducted to fulfill stipulations in the City of Los Angeles' Conditions of Approval for the expansion of the landfill.<sup>3</sup> Similar conditions cover the County of Los Angeles' portion of the landfill.<sup>4</sup>

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<sup>3</sup> Section C.10.a of Ordinance No. 172,933.

<sup>4</sup> County Condition 81.

## 2. Data Completeness

Completeness statistics for all measured variables during the 2021 winter quarter are shown in [Table 1](#). Data deemed as suspect are included in subsequent analyses (e.g., regional comparisons), while invalid data are not. The percent data capture for PM<sub>10</sub> was 100.0% at both the Landfill site and the Community site. Approximately 11.3% and 2.9% of the captured PM<sub>10</sub> data were invalidated at the Landfill and Community sites, respectively. No hourly PM<sub>10</sub> values were deemed suspect at either of the monitoring sites in this quarter.

**Table 1.** Data completeness statistics for hourly PM<sub>10</sub>, hourly BC, and 1-min wind speed and wind direction data for the 2021 winter quarter monitoring period.

Monitoring Location	Dates	Data Capture (%) <sup>a</sup>			Data Valid or Suspect (%) <sup>b</sup>			Data Suspect (%) <sup>c</sup>		
		PM <sub>10</sub>	BC	WS/WD	PM <sub>10</sub>	BC	WS/WD	PM <sub>10</sub>	BC	WS/WD
Sunshine Canyon Landfill (LS)	12/01/2020-02/28/2021	100.0	100.0	98.6	88.7	100.0	98.9	0.0	2.2	0.0
Community Site (CS)	12/01/2020-02/28/2021	100.0	99.1	98.9	97.1	100.0	98.9	0.0	4.8	0.0

<sup>a</sup> Data Capture is the number of collected data values divided by the total number of expected data intervals during the date range indicated in the "Dates" column (e.g., for the raw BC 1-hr data, 24 data values per day are expected), multiplied by 100.

<sup>b</sup> Data Valid or Suspect is the number of data values that are either valid or suspect divided by the number of captured data values, multiplied by 100.

<sup>c</sup> Data Suspect is the number of data values labeled as suspect divided by the number of captured data values, multiplied by 100.

Hourly BC data capture was 100.0% at the Landfill site and 99.1% at the Community site. No hourly BC data were invalidated at the Landfill site or the Community site. At the Landfill site, 2.2% of hourly BC data were deemed suspect; at the Community site, 4.8% hourly BC data were deemed suspect.

The wind data capture percentage was 98.6% at the Landfill site and 98.9% at the Community site. Among those captured data, none of the data were invalidated or deemed suspect at the Landfill site or the Community site.



### 3. PM<sub>10</sub> Exceedances

The federal and state PM<sub>10</sub> exceedances for the winter quarter of the baseline year (2002), the winter quarters of the previous 12 years (2008–2019), and the current winter quarter (2020/2021) are summarized in Table 2. During this quarter, the state 24-hr PM<sub>10</sub> standard (50 µg/m<sup>3</sup>) was exceeded on 32% of days (24 days out of the valid 76 days of the quarter) at the Landfill site and 4% of days at the Community site (3 days out of the valid 87 days of the quarter). This is the highest percentage of state PM<sub>10</sub> exceedances for the winter quarters on record at the Landfill site. Conversely, this is the third year in a row with no state PM<sub>10</sub> exceedances for the winter quarters at the Community site.

**Table 2.** Number of exceedances of federal and state 24-hr PM<sub>10</sub> standards during the winter quarters of the baseline year (2002) and years from 2008 to 2021. In the “Federal 24-hr” column, the values are number of exceedances and the date(s) on which those exceedances occurred. In the “State 24-hr” column, the values are number of exceedances/total days on which valid 24-hr averages were measured, and the percentage of exceedances out of the total number of days on which valid 24-hr average PM<sub>10</sub> concentrations were measured. The most recent winter quarter is shown in **bold**.

Site	Quarter Period	Quarter Name	Exceedances of PM <sub>10</sub> Standard	
			Federal 24-hr 150 µg/m <sup>3</sup>	State 24-hr 50 µg/m <sup>3</sup>
Sunshine Canyon Landfill (LS)	12/01/01–02/28/02	Baseline Year	0	8/55 (15%)
	12/01/07–02/29/08	2008 Winter	1 (02/14/08)	10/83 (12%)
	12/01/08–02/28/09	2009 Winter	1 (01/09/09)	3/51 (6%)
	12/01/09–02/28/10	2010 Winter	0	0/87 (0%)
	12/01/10–02/28/11	2011 Winter	1 (01/20/11)	7/90 (8%)
	12/01/11–02/29/12	2012 Winter	0	13/91 (14%)
	12/01/12–02/28/13	2013 Winter	0	2/88 (2%)
	12/01/13–02/28/14	2014 Winter	2 (12/04/13, 12/09/13)	14/90 (16%)
	12/01/14–02/28/15	2015 Winter	0	10/89 (11%)
	12/01/15–02/29/16	2016 Winter	0	4/91 (4%)
	12/01/16–02/28/17	2017 Winter	2 (12/02/16, 12/18/16)	12/86 (14%)
	12/01/17–02/28/18	2018 Winter	2 (12/05/17, 12/17/17)	11/43 (26%)
	12/01/18–02/28/19	2019 Winter	0	4/90 (5%)
	12/01/19–02/27/20	2020 Winter	1 (12/17/19)	25/86 (29%)
	<b>12/01/20–02/28/21</b>	<b>2021 Winter</b>	<b>4 (12/03/20, 12/07/20, 12/23/20, 01/19/21)</b>	<b>24/76 (32%)</b>

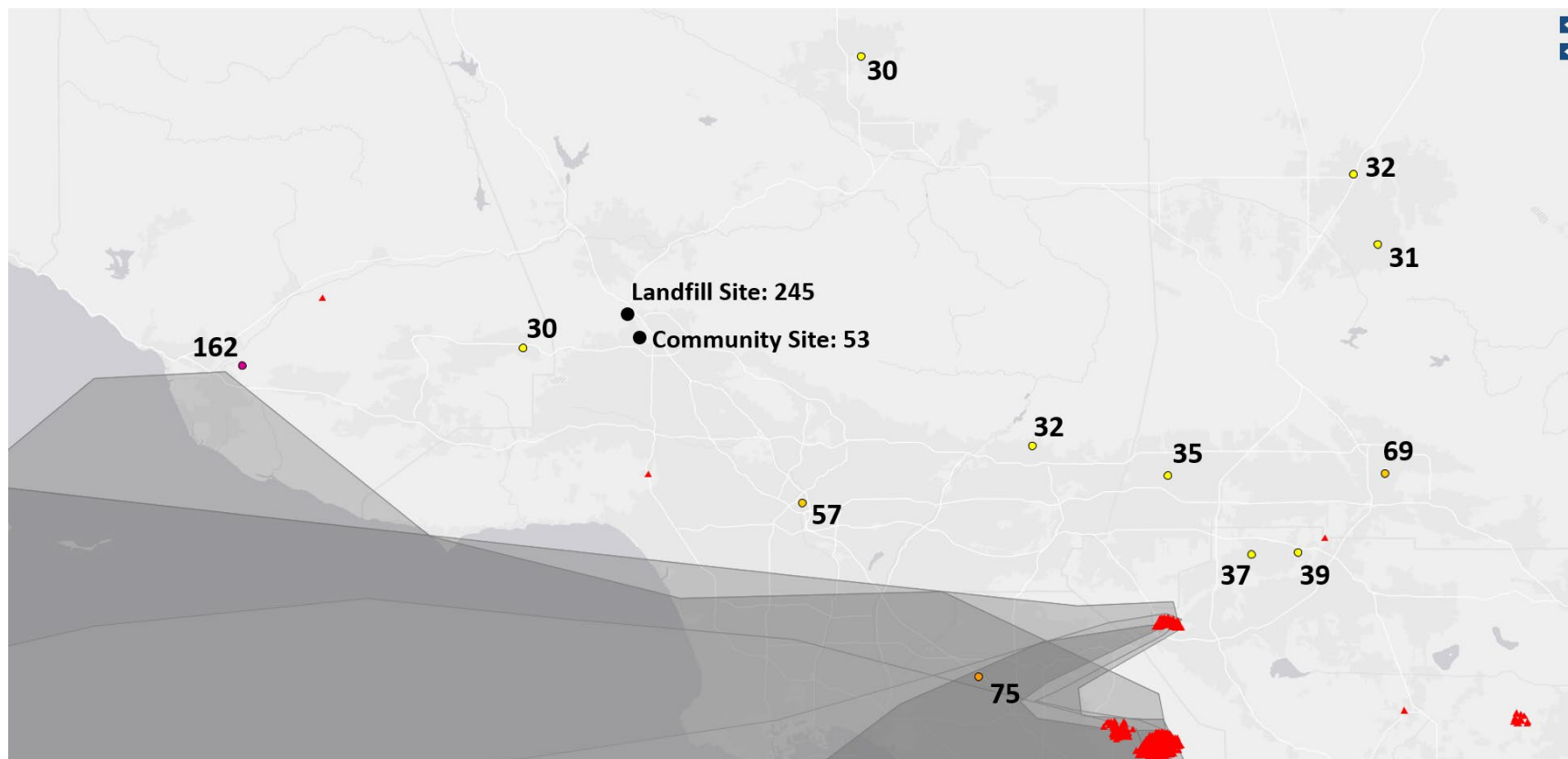
Site	Quarter Period	Quarter Name	Exceedances of PM <sub>10</sub> Standard	
			Federal 24-hr 150 µg/m <sup>3</sup>	State 24-hr 50 µg/m <sup>3</sup>
Community Site (CS)	12/01/01–02/28/02	Baseline Year	0	7/70 (10%)
	12/01/07–02/29/08	2008 Winter	0	2/73 (3%)
	12/01/08–02/28/09	2009 Winter	0	6/85 (7%)
	12/01/09–02/28/10	2010 Winter	0	0/81 (0%)
	12/01/10–02/28/11	2011 Winter	0	1/88 (1%)
	12/01/11–02/29/12	2012 Winter	0	2/86 (2%)
	12/01/12–02/28/13	2013 Winter	0	3/87 (3%)
	12/01/13–02/28/14	2014 Winter	0	1/90 (1%)
	12/01/14–02/28/15	2015 Winter	0	4/88 (5%)
	12/01/15–02/29/16	2016 Winter	0	0/91 (0%)
	12/01/16–02/29/17	2017 Winter	0	2/90 (3%)
	12/01/17–02/28/18	2018 Winter	0	4/85 (5%)
	12/01/18–02/28/19	2019 Winter	0	0/80 (0%)
	12/01/19–02/27/20	2020 Winter	0	0/88 (0%)
	<b>12/01/20–02/28/21</b>	<b>2021 Winter</b>	<b>0</b>	<b>0/87 (0%)</b>

The federal 24-hr PM<sub>10</sub> standard (150 µg/m<sup>3</sup>) was exceeded on 4 days at the Landfill site, and on 0 days at the Community site. The Landfill site saw the highest number of 24-hr PM<sub>10</sub> federal exceedance days this quarter among the 14 winter quarters of PM<sub>10</sub> measurements, including the baseline year (2001–2002). [Figures 2 through 5](#) show 24-hr PM<sub>10</sub> concentrations at sites across the Los Angeles region on the days when the federal 24-hr PM<sub>10</sub> standard was exceeded at the Landfill site. When present, satellite fire detects and smoke plumes are shown.

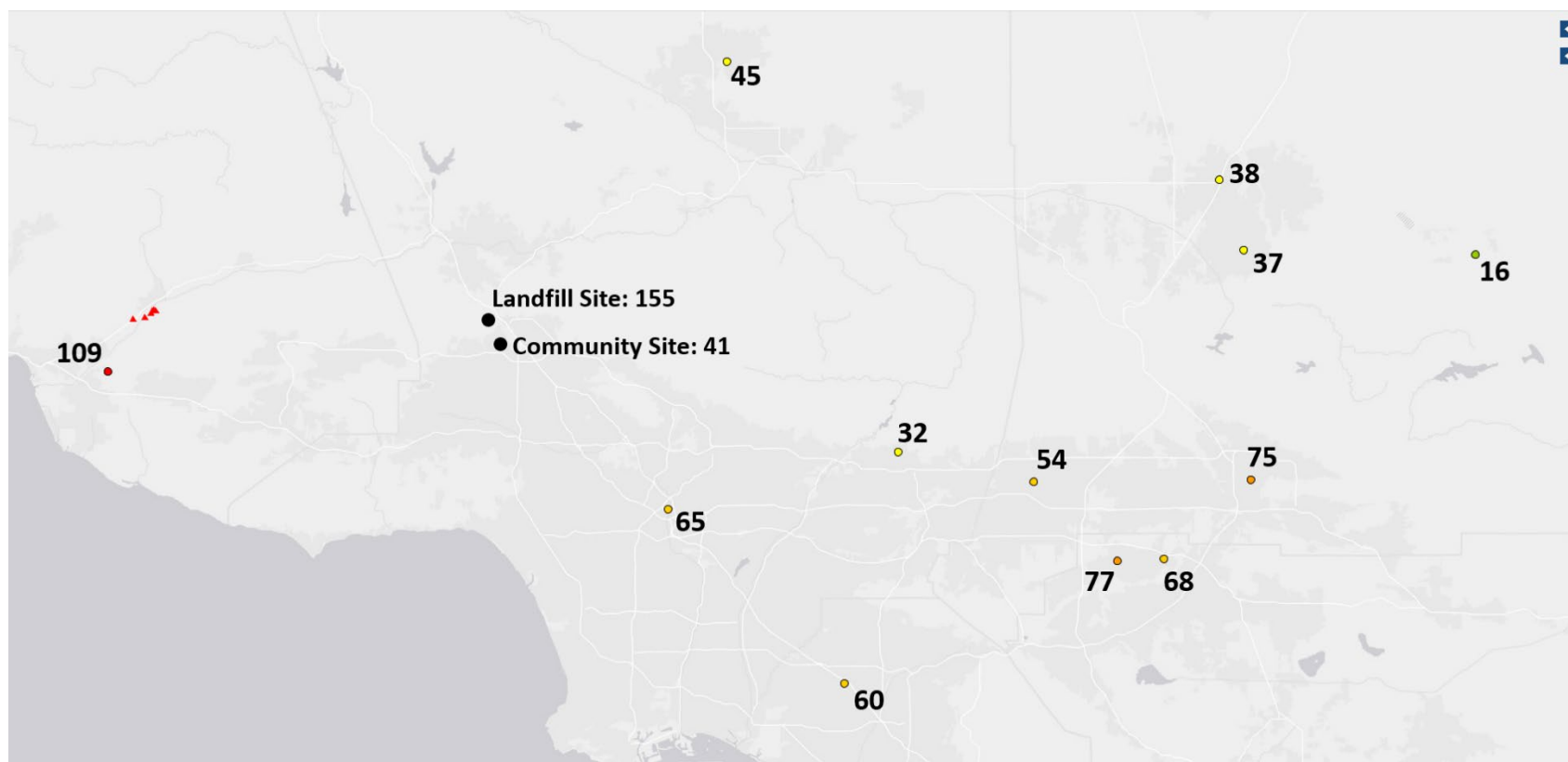
As shown in [Figures 3 through 5](#), federal exceedances occurring at the Landfill site on December 7, December 23, and January 19 were distinctive within the Los Angeles area. In addition, Figure 2 depicts only one other federal exceedance on December 3, 2020; most likely impacted by wildfire smoke at that site. The Landfill site concentrations on the four federal exceedance days were 225%–360% higher than concentrations measured at the Community site on the four federal exceedance days (with concentrations at the Community site exceeding the State PM<sub>10</sub> standard on December 3 and January 19). We must assume landfill activity played a key role in these federal exceedances; however, the level of uncertainty in quantifying landfill contributions to neighborhood-scale pollutant concentrations remains high without the presence of an upwind landfill monitoring site.

It should also be noted wildfire activity nearby may have played a role in the Landfill site federal exceedance and Community site state exceedance on January 19<sup>th</sup>. As shown in Figure 5, a wildfire

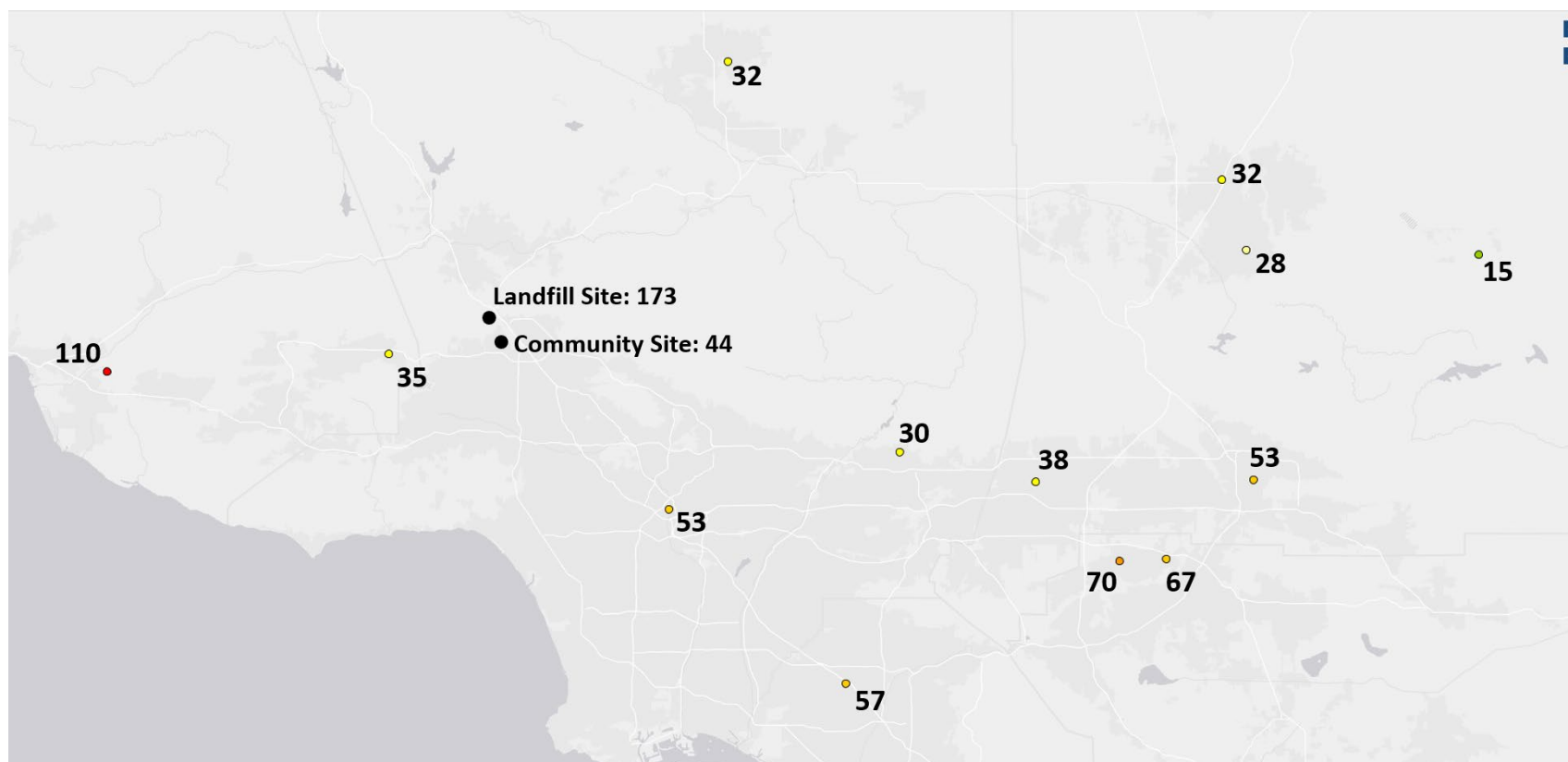
was evident just northwest of the landfill and therefore, makes it is difficult to quantify the impact landfill activities had on the Landfill site.



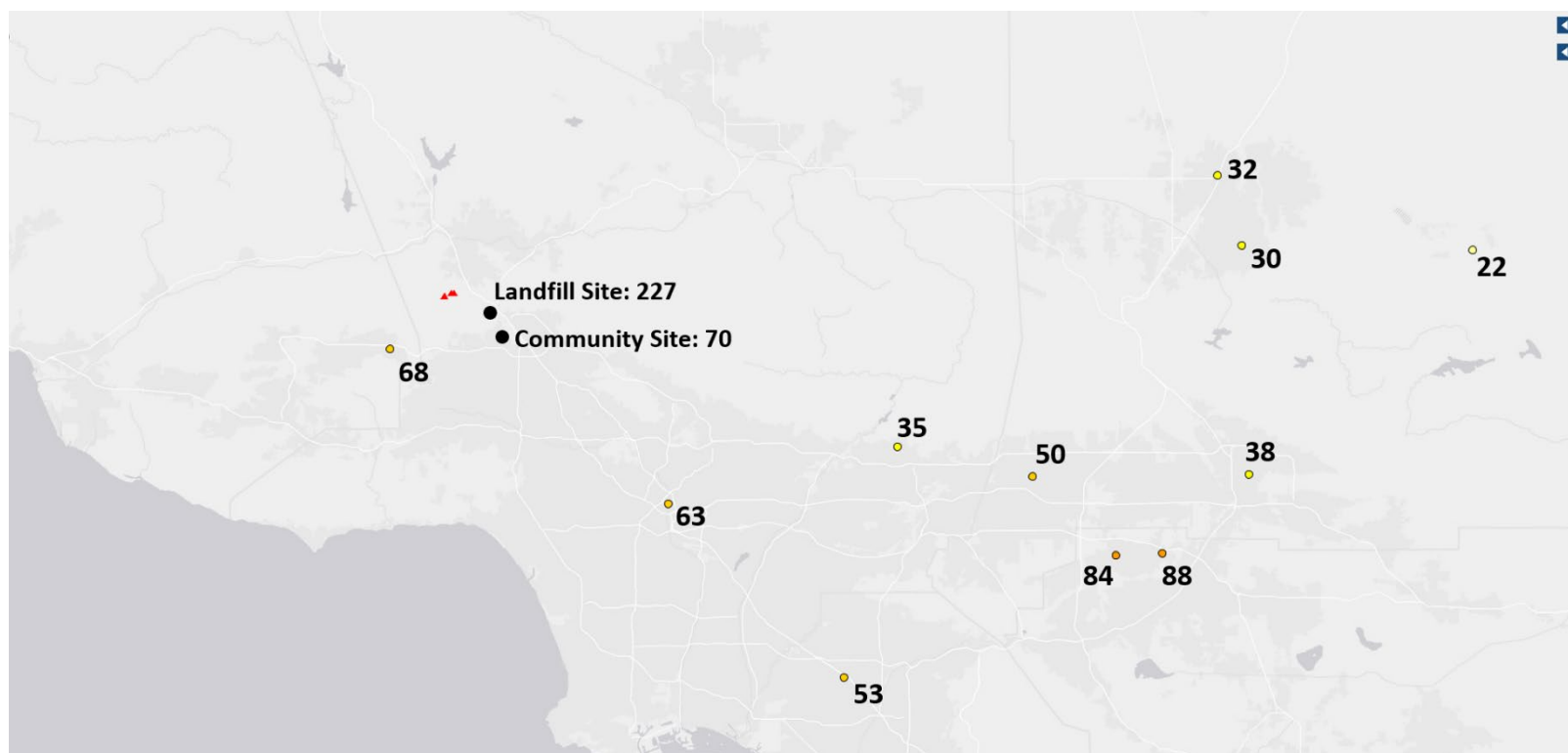
**Figure 2.**  $PM_{10}$  concentrations at sites across the Los Angeles area on December 3, 2020. Values next to each site show the 24-hr  $PM_{10}$  concentration in  $\mu g/m^3$ . Note: one other site (within the map domain) recorded 24-hr  $PM_{10}$  concentrations above the federal standard. Red triangles depict locations of the active wildfire hotspot events on this day and grey polygons depict observed smoke plumes.



**Figure 3.** PM<sub>10</sub> concentrations at sites across the Los Angeles area on December 7, 2020. Values next to each site show the 24-hr PM<sub>10</sub> concentration in µg/m<sup>3</sup>. Note: no other sites (within the map domain) recorded 24-hr PM<sub>10</sub> concentrations above the federal standard. Red triangles depict locations of the active wildfire hotspot events on this day.



**Figure 4.** PM<sub>10</sub> concentrations at sites across the Los Angeles area on December 23, 2020. Values next to each site show the 24-hr PM<sub>10</sub> concentration in µg/m³. Note: several sites recorded 24-hr PM<sub>10</sub> concentrations above the federal standard. No active wildfire hotspot events were within the map domain on this day.



**Figure 5.** PM<sub>10</sub> concentrations at sites across the Los Angeles area on January 19, 2021. Values next to each site show the 24-hr PM<sub>10</sub> concentration in µg/m³. Note: no other sites (within the map domain) recorded 24-hr PM<sub>10</sub> concentrations above the federal standard. Red triangles depict locations of the active wildfire hotspot events on this day.



## 4. Average and Maximum Black Carbon and PM<sub>10</sub> Concentrations

Although no federal or state standards exist for BC concentrations in ambient air, BC is a measurable component of ambient air that correlates well with DPM. Because of growing evidence that DPM is associated with several negative health effects, BC is often measured in an attempt to quantify the relative amounts of DPM in ambient air. Findings from the Multiple Air Toxics Exposure Study IV (MATES IV), conducted by the South Coast Air Quality Management District (SCAQMD), found DPM to be the most important toxic air pollutant contributing to risk in the Los Angeles basin (South Coast Air Quality Management District, 2015).

BC is measured by an Aethalometer, which passes air through a filter tape that traps the suspended particles. Light-absorbing particles attenuate a light beam projected through the deposit. The buildup of BC on the air sampling tape causes an artifact that affects the accuracy of the measured concentration (Drinovec et al., 2015; Allen, 2014), subjecting Aethalometers to a saturation effect. Instrument response is dampened with heavier loading (i.e., higher concentrations) of BC aerosol. This artifact can cause BC concentration readings to be lower than the true concentration. However, mathematical methods to correct the BC concentration values are available and widely used. All the reported BC values to date from the Landfill, Landfill North, and Community sites have been adjusted in this report to compensate for this tape saturation effect; this compensation had not been performed in quarterly reports prior to the 29<sup>th</sup> Quarterly Report (winter 2015). Because the compensation process changes the reported concentration, and because uncompensated values were used in previous reports, prior-year BC concentrations shown in this report do not match concentrations reported prior to the 29<sup>th</sup> Quarterly Report. All BC data shown in this Quarterly Report have been compensated, with the exception of data from the baseline year, which are unavailable.

The 24-hr average and maximum compensated BC concentrations collected during the 2021 winter quarter, the compensated BC data from the winter quarters of the 13 previous years, and the uncompensated data from the baseline year are provided in [Table 3](#). The 2021 winter quarter 24-hr BC concentration average at the Landfill site is the lowest of all of the winter quarters. At the Community site, the 2021 winter quarter 24-hr BC concentration average is also the lowest of all of the winter quarters.

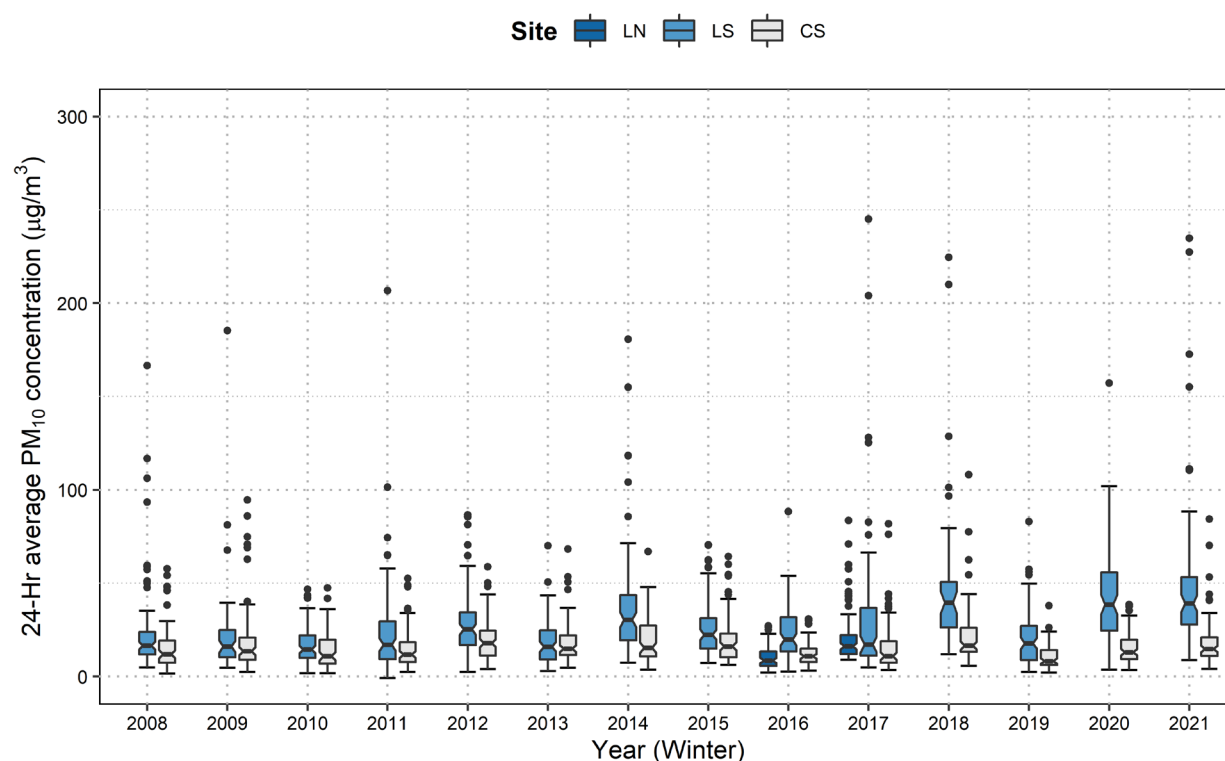
**Table 3.** 24-hr BC concentrations for the winter quarter of the baseline year (2002) and each year from 2008 to 2021. Uncompensated BC values are reported for the 2002 winter quarter. The most recent winter quarter is shown in **bold**.

Site	Quarterly Period	Quarter Name	BC Concentrations (µg/m <sup>3</sup> )	
			Average 24-Hr	Maximum 24-Hr
Sunshine Canyon Landfill (LS)	12/01/01–02/28/02	Baseline Year	0.88*	3.49*
	12/01/07–02/28/08	2008 Winter	0.78	2.87
	12/01/08–02/28/09	2009 Winter	0.73	2.63
	12/01/09–02/28/10	2010 Winter	0.89	3.06
	12/01/10–02/28/11	2011 Winter	0.63	2.82
	12/01/11–02/28/12	2012 Winter	0.70	2.17
	12/01/12–02/28/13	2013 Winter	0.70	2.38
	12/01/13–02/28/14	2014 Winter	0.79	2.90
	12/01/14–02/28/15	2015 Winter	0.75	3.17
	12/01/15–02/29/16	2016 Winter	0.38	1.47
	12/01/16–02/28/17	2017 Winter	0.53	2.17
	12/01/17–02/28/18	2018 Winter	0.49	1.24
	12/01/18–02/28/19	2019 Winter	0.44	2.13
	12/01/19–02/27/20	2020 Winter	0.39	1.26
	<b>12/01/20–02/28/21</b>	<b>2021 Winter</b>	<b>0.35</b>	<b>1.3</b>
Community Site (CS)	12/01/01–02/28/02	Baseline Year	0.76*	3.72*
	12/01/07–02/28/08	2008 Winter	0.58	2.07
	12/01/08–02/28/09	2009 Winter	0.68	3.73
	12/01/09–02/28/10	2010 Winter	0.76	2.29
	12/01/10–02/28/11	2011 Winter	0.60	2.82
	12/01/11–02/28/12	2012 Winter	0.57	2.18
	12/01/12–02/28/13	2013 Winter	0.50	1.95
	12/01/13–02/28/14	2014 Winter	0.51	1.84
	12/01/14–02/28/15	2015 Winter	0.85	2.99
	12/01/15–02/29/16	2016 Winter	0.51	2.62
	12/01/16–02/28/17	2017 Winter	0.54	2.41
	12/01/17–02/28/18	2018 Winter	0.45	1.50

Site	Quarterly Period	Quarter Name	BC Concentrations (µg/m <sup>3</sup> )	
			Average 24-Hr	Maximum 24-Hr
	12/01/18–02/28/19	2019 Winter	0.35	1.36
	12/01/19–02/27/20	2020 Winter	0.36	1.35
	<b>12/01/20–02/28/21</b>	<b>2021 Winter</b>	<b>0.31</b>	<b>1.0</b>

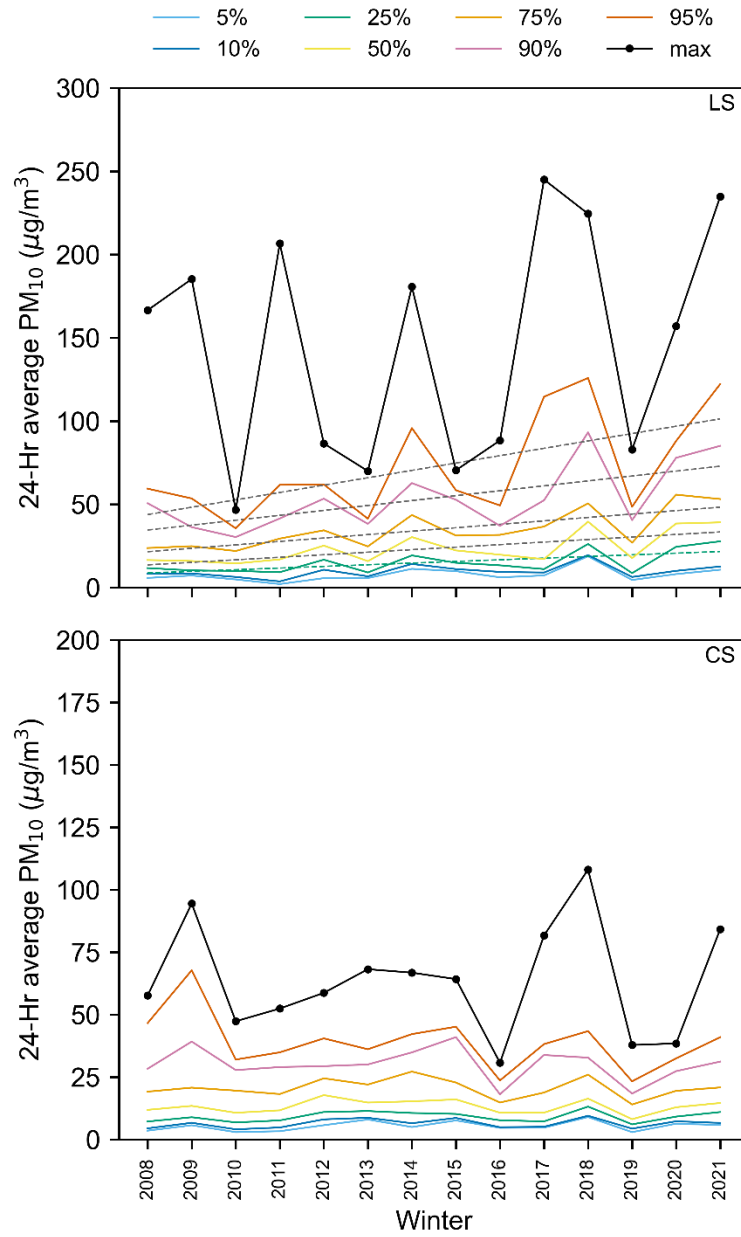
<sup>a</sup> Uncompensated BC values.

Distributions of 24-hour average PM<sub>10</sub> and BC data from winter quarters of 2008 through 2021 (presented as notched box-whisker plots<sup>5</sup>), and percentile trends for these metrics, are shown in [Figures 6 through 9](#).

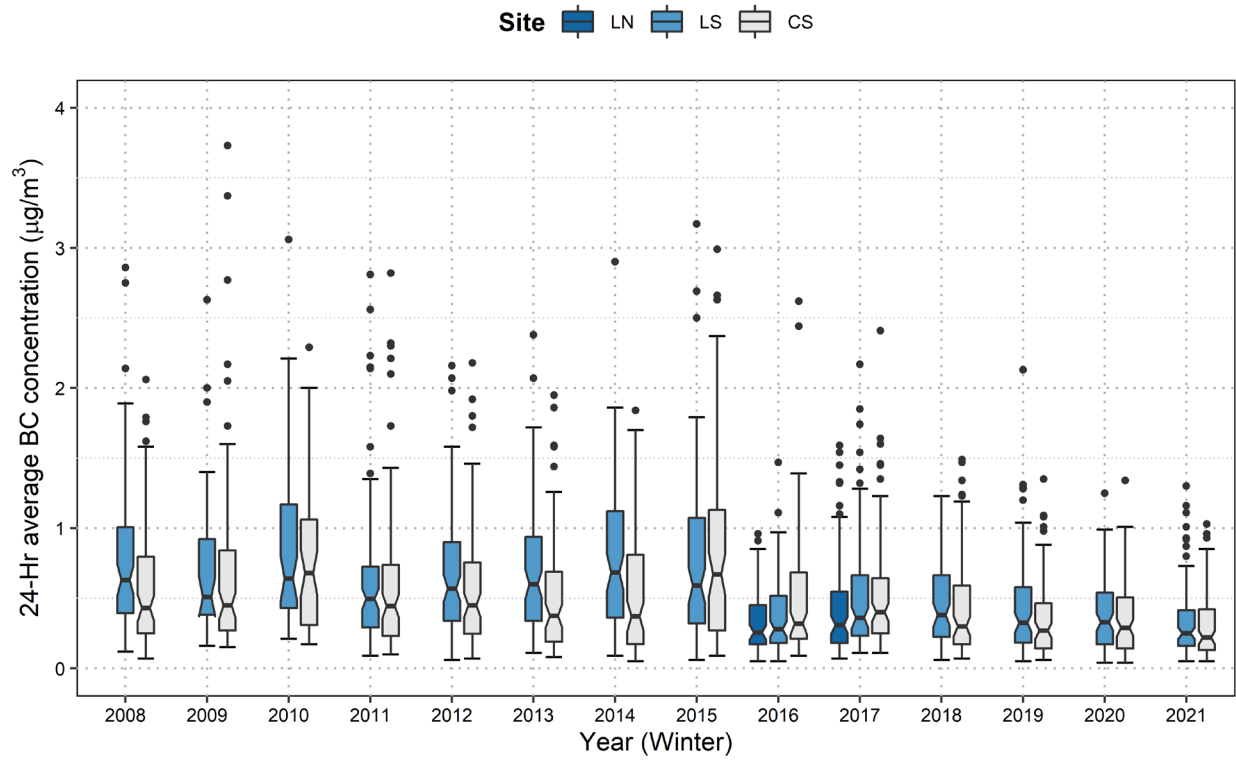


**Figure 6.** Distribution of 24-hr average PM<sub>10</sub> concentrations at the Sunshine Canyon Landfill North site (LN), Landfill site (LS), and Community site (CS) during winter (December-February) quarters from 2008 to 2021.

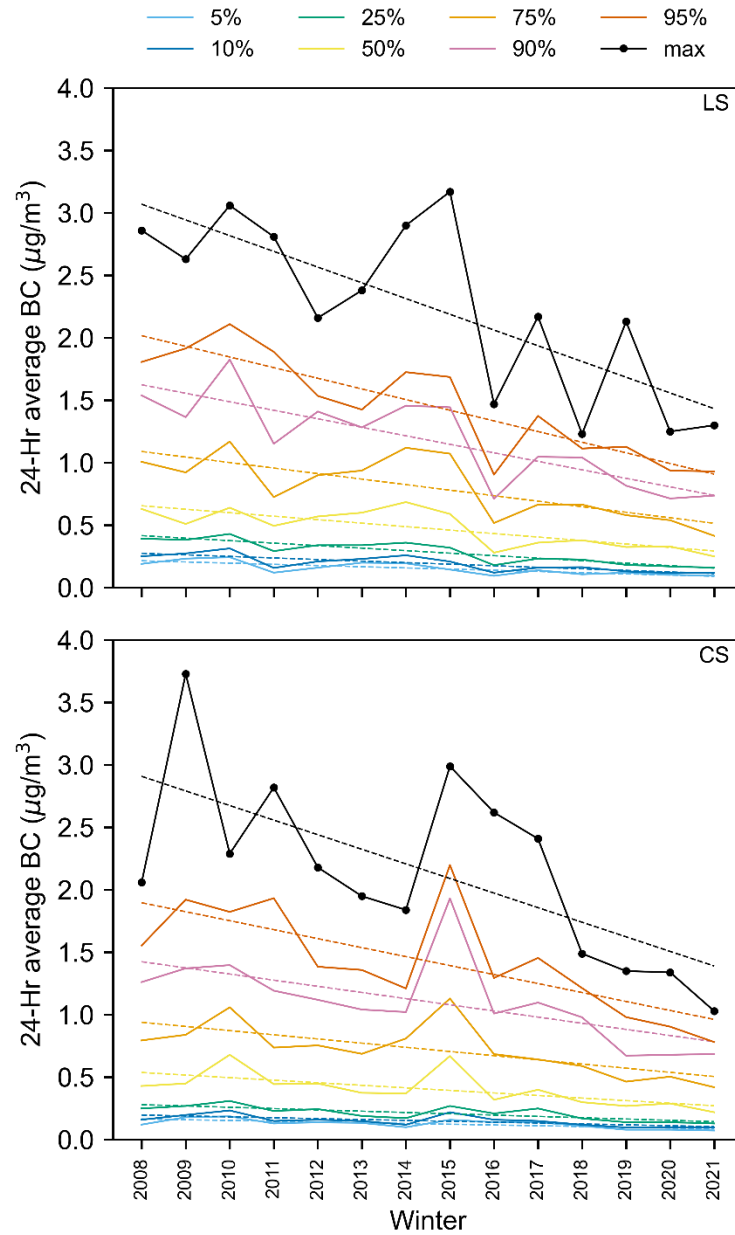
<sup>5</sup> A notched box-whisker plot shows the entire distribution of concentrations for each year. Each box illustrates the 25<sup>th</sup> (lower-box extent), 50<sup>th</sup> (median, midline), and 75<sup>th</sup> (upper-box extent) percentiles. The extent of the box indicates the interquartile range (IQR), where 50% of the data lie. The whiskers indicate values that are up to 1.5 times the IQR from the 25<sup>th</sup> or 75<sup>th</sup> percentile. Data outside of the IQR are referred to as “outliers” and are plotted individually. The boxes are notched (narrowed) at the median and return to full width at the 95% lower- and upper-confidence interval values (i.e., the extents of the notches indicate the range in which the median falls with 95% confidence). If the notches of any two boxes do not overlap, there is strong evidence that the medians are statistically different at the 95% confidence level.



**Figure 7.** Trends of 24-hr average PM<sub>10</sub> maxima and percentiles at the Sunshine Canyon Landfill site (LS, top) and Community site (CS, bottom) during winter (December-February) quarters from 2008 to 2021. The colored dashed lines denote statistically significant decreasing linear trends. Statistical significance was defined at the 95% confidence level ( $p\text{-value} \leq 0.05$ ).



**Figure 8.** Distribution of 24-hr average BC concentrations at the Sunshine Canyon Landfill North site (LN), Landfill site (LS), and Community site (CS) during winter (December-February) quarters from 2008 to 2021.



**Figure 9.** Trends of 24-hr average BC maxima and percentiles at the Sunshine Canyon Landfill site (LS, top) and Community site (CS, bottom) during winter (December-February) quarters from 2008 to 2021. The colored dashed lines denote statistically significant decreasing linear trends. Statistical significance was defined at the 95% confidence level ( $p\text{-value} \leq 0.05$ ).

At this time of year, the median 24-average PM<sub>10</sub> concentrations measured at the Community site are usually lower than those measured at the Landfill site (Figure 6). This remained true in the 2021 winter quarter. As indicated by the non-overlapping notches (and the entire interquartile range) in the box-whisker plot, the difference between the median 24-hour PM<sub>10</sub> concentrations at the Community and the Landfill sites is statistically significant. At the Landfill site, there is a statistically

significant increasing trend in all of the 24-hr averages (Figure 7). All percentiles except the 75<sup>th</sup> percentile of the 24-hr average PM<sub>10</sub> concentration at the Landfill site have increased since the 2020 winter quarter. At the Community site, there is not a statistically significant trend for all the 24-hr average PM<sub>10</sub> percentiles or maximum value; only the 5<sup>th</sup> and 10<sup>th</sup> percentiles in the 2021 winter quarter are lower than their counterparts in the 2020 winter quarter.

During the winter quarters, the median 24-hr average BC concentrations are not usually significantly different between the Landfill and the Community sites, as indicated by overlapping notches in the box-whisker plot (Figure 8). In the winter 2021 quarter, the median 24-hr average BC concentration at the Landfill site was not statistically higher than that at the Community site, as indicated by the overlapping notches in the box-whisker plot. There is some year-to-year variability in median 24-hr average BC concentrations over the 14 recorded consecutive years, but the range of 24-hr average BC values has generally decreased over time at both monitoring sites. In the winter 2021 quarter, both the Landfill site and the Community site saw lower median 24-hr average BC concentrations than in the previous winter quarter.

There is a statistically significant decreasing trend in 24-hr average BC concentrations at the 5<sup>th</sup> through 95<sup>th</sup> percentiles, and the maximum 24-hour BC concentrations at the Landfill site during winter quarters over the observational record (Figure 9). All percentiles of the 24-hr BC recorded in the 2021 winter quarter are approximately the same as the previous winter quarter – only the 90<sup>th</sup> percentile and the maximum increased slightly. At the Community site, there is also a statistically significant declining trend in winter quarter 24-hr average BC concentrations, at the 5<sup>th</sup> to 95<sup>th</sup> percentiles and the 24-hr maximum BC over the 13 recorded consecutive years. Only the 90<sup>th</sup> percentile of 24-hr BC and 24-hr maximum BC were higher in the 2021 winter quarter than in the previous winter quarter. There were no statistically significant increasing trends in the maxima or percentiles.



## 5. Field Operations

Tables 4 and 5 list dates and major tasks associated with visits to the Landfill site and the Community site during the 2021 winter quarter.

**Table 4.** Landfill monitoring site (LS) visits, field maintenance, and operations.

Date of Site Visit	Description of Work
12/09/2020	Investigated communication issue Rebooted proxy Found PC infected with Trojan virus Advised IT to fix Restarted Envidas
01/03/2021	Verified remote access to PC for data collection
01/11/2021	Collected PM <sub>10</sub> and BC data Restarted Aethalometer Checked Aethalometer and BAM tape supplies BAM tape break BAM tape replaced Performed flow test on BAM and Aethalometer
02/10/2021	Restarted router Found BAM down with power failure warning Power cycled BAM BAM returned to sampling
03/01/2021 <sup>a</sup>	Investigated communication issue Found Advantech PC Initiated recovery from unexpected shut down Restarted Envidas Verified remote access

<sup>a</sup> The next site visit that occurred after the current quarter is included in this report. The information from this site visit is used to assess the quality of the last portion of data from the current quarter.

**Table 5.** Community site (CS) visits, field maintenance, and operations.

Date of Site Visit	Description of Work
01/04/2021	Collected PM <sub>10</sub> and BC data Restarted Aethalometer Checked Aethalometer and BAM tape supplies Performed flow check on Aethalometer and BAM Cleaned BAM roller, vane, and nozzle Performed leak test on BAM and passed
02/15/2021	Restarted BAM Spooled new roll of tape for BAM.
03/22/2021 <sup>a</sup>	Collected PM <sub>10</sub> and BC data Restarted Aethalometer Cleaned Aethalometer roller and checked tape supply Cleaned BAM roller, vane, and nozzle and checked tape supply Performed leak and flow tests on BAM

<sup>a</sup> The next site visit that occurred after the current quarter is included in this report. The information from this site visit is used to assess the quality of the last portion of data from the current quarter.

Aethalometer and BAM flow rates measured with a National Institute of Standards and Technology (NIST)-traceable flow standard are shown in [Table 6](#). BAM flow rates are volumetric (i.e., they depend on local temperature and pressure), and Aethalometer flow rates are at standard temperature and pressure. The target flow rate of the BAM is 16.7 liters per minute (lpm) volumetric to meet the 10-micron particle cut point of the inlet, with an acceptable range of 16.0 lpm to 17.3 lpm. The Aethalometer has no particle size cut point.

**Table 6.** Flow rates for the BAM PM<sub>10</sub> and Aethalometer BC monitors at the Landfill and Community sites. "Ref." is the Reference and "Aeth." is the Aethalometer.

Location	Date	Flow Rate (lpm)					
		As Found		As Left		As Found	
		BAM	Ref.	BAM	Ref.	Aeth.	Ref.
Sunshine Canyon Landfill (LS)	01/04/2021	16.7	16.7	16.99	16.7	4	3.93
	02/15/2021	NA	NA	NA	NA	NA	NA
	03/22/2021 <sup>a</sup>	16.7	16.7	1.64	16.7	4	3.78
Community Site (CS)	12/09/2020	NA	NA	NA	NA	NA	NA
	01/04/2021	NA	NA	NA	NA	NA	NA
	01/11/2021	Unknown	16.7	16.59	16.7	4.2	4
	03/01/2021 <sup>a</sup>	NA	NA	NA	NA	NA	NA

<sup>a</sup> The next site visit that occurred after the current quarter is included in this report. The information from this site visit is used to assess the quality of the last portion of data from the current quarter.



## 6. References

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