SLO COUNTY apcd | Air Pollution Control District San Luis Obispo County

Frequently Asked Questions

Air Quality and the Temporary Closure of Oceano Dunes

Created by SLO County APCD, June 30, 2020

Q1: How does the temporary closure of the Oceano Dunes affect air quality?

A1: Neither the District nor the Scientific Advisory Group (SAG)[1] expect the temporary cessation of OHV activity to have any immediate or significant impact on dust levels downwind of the ODSVRA. In a letter dated April 6 and posted to the District website on April 13,[2] the SAG explained that:

> *"decades of OHV activity have fundamentally altered the natural beach-dune landscape, making the dunes significantly more susceptible to PM emissions than they would be in a natural state. The SAG does not expect a few weeks or months of temporary OHV restrictions to substantially alter the balance of human versus natural contributions to PM emissions at ODSVRA."*

Many people have assumed that the current absence of OHVs will result in improved air quality, or that the temporary cessation provides an opportunity to test the impact of OHV activity on air quality. This, however, is based on a common misunderstanding about the connection between OHV activity and dust. As discussed in more detail in an FAQ posted to the District website a year ago,[3] it is not the dust kicked up by OHV activity (i.e. "rooster tails") that causes poor air quality downwind, nor is it their tailpipe emissions. Rather, it is the secondary effects to vegetation and dune shapes that lead to greater wind erosion and more dust when the wind blows. It is true that without wind, there would be no significant dust, but changes to key vegetation areas and dune structures caused by OHVs results in more sand movement and more dust emissions when the wind blows.

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[1] The SAG is the group of experts selected jointly by District and California Department of Parks and Recreation to advise on ODSVRA dust issues.

[2] Scientific Advisory Group, "Memo: SAG comments on the temporary closure of Oceano Dunes State Vehicular Recreation Area (ODSVRA) and impacts on particulate matter (PM) emissions," April 6, 2020. Available online at https://storage.googleapis.com/slocleanair-org/images/cms/upload/files/SAG%20Letter.pdf

[3] SLO County APCD, "Responses to Comments Received on the May 1, 2019 Workshop Version of the DPMRP," June 11, 2019. Available online at https://storage.googleapis.com/slocleanair-org/images/cms/upload/files/Response%20to%20Comments_FINAL_PostedJune122019.pdf

Left alone, it will take years or decades for the dunes to return to their natural, undisturbed state, even in the complete absence of human activity.[4] It takes years for plants to grow and decades for dunes to re-equilibrate. Therefore, it is naïve to assume that a few weeks or months without OHV activity will result in significant improvements in downwind air quality.

Finally, the recent grading by State Parks in front of the foredunes[5,6,7] may be contributing to some of the emissions this year, but it is doubtful the amount can be determined from the existing monitoring system since the grading was not a disclosed activity when the monitoring system was designed.

Q2: Why have there been more exceedances in 2020 than by this point last year?

A2: In simple terms, it was a very windy spring. 2020 is by far the windiest of the last 6 years, while 2019 was the least windy.

The ODSVRA only generates dust when conditions are windy, and this occurs more frequently in some years than others. In other words, just as some years are wetter or hotter than others, some years (or portions of years) are windier than others. All else being equal, more exceedances are expected in a windier year than in a less windy year.

As shown in the Table 1 and Figure 1 below, 2020 has been exceptionally windy, with more wind events to date than over the same period in any of the previous 5 years. A wind event is a day when winds are strong enough and out of the right direction such that the PM_{10} standard is likely to be exceeded.[8] As shown in the table and figure, **2020 is the windiest of the last 6 years, while 2019 was the least windy.**

[4] This is why revegetation is the key mitigation measure being used on the ODSVRA. It would certainly require less resources for State Parks to simply fence off large areas from OHV use and let nature reclaim them; however, it would likely take many years before this strategy would result in significant air quality improvements. By "jump starting" areas with seed, seedlings, and in some cases ground cover, air quality benefits can be realized much more quickly.
[5] Vaughn, M., "Coastal Commission investigates bulldozers on the beach at Oceano Dunes," *The Tribune* [San Luis Obispo], May 5, 2020. Available online at https://www.sanluisobispo.com/news/local/environment/article242516126.html.
[6] California Coastal Commission, "Th11a: Staff Report: CDP Amendment Application No. 3-12-050-A1 (California Department of Parks and Recreation ODSVRA Dust Control, Grover Beach/Oceano, San Luis Obispo Co.)," June 19, 2020. Available online at https://documents.coastal.ca.gov/reports/2020/7/Th11a/th11a-7-2020-report.pdf.
[7] Letter from Lisa Haage, California Coastal Commission, to Lisa Mangat and Liz McGuirk, California Department of Parks and Recreation, "Re: Violation File No. V-3-20-0048 - Oceano Dunes State Vehicular Recreation Area (ODSVRA)," June 16, 2020.
[8] In general, strong afternoon winds out the WNW to NW predict a PM_{10} exceedance at CDF. The formal definition used here is any day when the 3 p.m. PST hourly wind speed at CDF exceeds 8 mph and the 1 p.m. PST hourly wind direction is between 290 and 360°; however, small changes to these threshold values don't affect the overall analysis much. For further details, see Appendix A of SLO County APCD, "2017 Annual Air Quality Report," November 2018, available online at https://storage.googleapis.com/slocleanair-org/images/cms/upload/files/2017aqrt-FINAL2.pdf.

Table 1: Wind Events and Number of Days Exceeding the PM_{10} Std		
Year	Year-to-Date (Jan 1 – June 28)	
	# of High Wind Event Days	CDF Central Site # of Violations
2020	**55**	**30**
2019	30	16
2018	47	34
2017	47	44
2016	45	44
2015	36	35

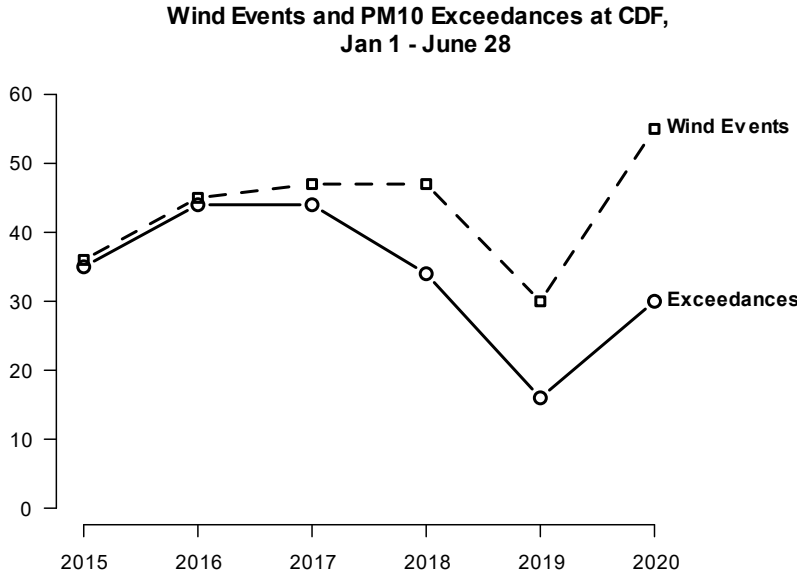

Figure 1: Wind Events and PM10 Exceedances at CDF

The table and figure also show that for 2020 year-to-date, there have been 30 violations of the California PM_{10} air quality standard at the CDF site. Comparing to 2019 only, which had a historically low 16 violations at CDF, it would appear that the 2020 mitigations and COVID-19 closure have not improved the air. However, this ignores the significant year-to-year differences in the winds. For example, other years had fewer wind events yet more exceedances than 2020. Finally, focusing on the number of exceedances ignores the dramatic reductions in the magnitude of the exceedances which is explained in question 3 below.

Q3: What effect have the dust mitigations had on downwind air quality?

A3: The short answer is that we have seen real, significant improvements in air quality, especially at CDF, and especially after taking meteorology (wind) into account. This improvement is not due to the temporary cessation of OHV-activity (as explained in answer A1, above), but rather to the large mitigation projects installed prior to the ODSVRA's closure to vehicles.

Several lines of evidence support this conclusion:

- As noted in answer A2, 2020 so far has been windiest year of the last 6 years, yet it has had the second fewest number of PM_{10} exceedances. The only year with fewer exceedances by this point was 2019, which was the least windy of the last 6 years.

- While there have been 30 exceedances at CDF so far this year as shown in Table 1, the PM_{10} levels there have not been as extreme as in previous years. For example, this year to date there have been only 3 hours at CDF with PM_{10} concentration greater than 300 $\mu g/m^3$; by this time last year there were 22 hours above 300ug/m3, and up to 83 hours above 300 ug/m3 in 2017. See Table 2 and Figure 2, below.

Table 2: Number of hours PM_{10} > threshold, Jan 1 through June 28

Year	Hours > 300 $\mu g/m^3$		Hours > 400 $\mu g/m^3$		Hours > 500 $\mu g/m^3$	
	CDF	Mesa2	CDF	Mesa2	CDF	Mesa2
2020	***3***	***16***	**0**	**4**	**0**	**2**
2019	22	10	5	2	0	0
2018	31	9	0	0	0	0
2017	83	18	31	2	8	1
2016	56	20	16	3	2	0
2015	51	23	27	6	10	2

Similarly, there have been no days so far this year when the 24-hour average PM_{10} level exceeded 100 $\mu g/m^3$ (twice the daily health standard). By this time last year, which was a low year for pollution, there had already been 2 days with daily averages above 100 $\mu g/m^3$. Compare that to 2017 when we had 12 days that were above 100 $\mu g/m^3$ by this time of the year. For more information on highest daily hours, see the tables of Top 10 Daily Averages and Daily Maxima, in the Appendix.

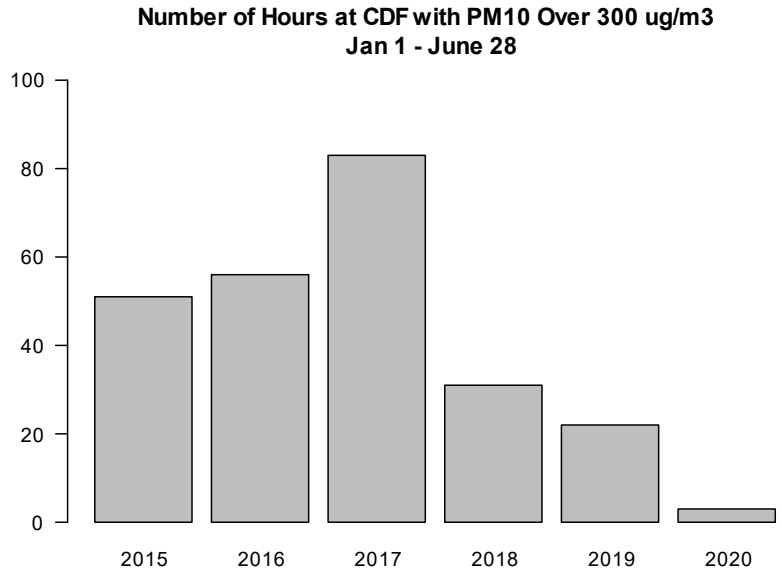

Figure 2: Hours greater than 300 ug/m3 at CDF

- In 2018, State Parks deployed over 100 acres of new dust controls to the ODSVRA, and in late 2019 they began installing another 92.2 acres of dust controls.[9] These were installed mostly upwind of CDF, and were not expected to have significant impacts on air quality at the Mesa2 monitoring station. Consistent with this, **dust levels at CDF have decreased relative to the levels at Mesa2, and now CDF typically has better air quality than Mesa2**. In prior years, during windblown dust events, PM_{10} at CDF was almost always greater than Mesa2, but this year Mesa2 is usually higher. On the 31 days when either or both sites exceeded the standard, the 24-hour average at Mesa2 was higher than CDF 24 times. The CDF average was greater than Mesa2 on only 6 days, and one day was tied.

- Additionally, the air quality improvements at CDF noted in the first two bullet points are not observed at Mesa2:
    - 2020 is the windiest year since 2015 (as shown in Table 1), and in contrast to CDF, Mesa2 has the second highest number of exceedances this year.
    - The number of hours exceeding 300 µg/m^3 at Mesa2 in 2020 is consistent with previous years; this year has most hours exceeding 400 and 500 µg/m^3.
    - As shown in the Appendix tables, the decrease in peak levels seen at CDF in 2020 is not seen for Mesa2.

- Finally, the decrease in PM_{10} levels at CDF relative to Mesa2 can be quantified and doing so implicitly accounts for year-to-year differences in windiness. Applying methodology

[9] These 92.2 acres are pursuant to the November 2019 Amendment to Stipulated Order for Abatement #17-01 (available online at https://storage.googleapis.com/slocleanair-org/images/cms/upload/files/AMENDED%20Order%20of%20Abatement%2011-18-19_FILED_12.pdf), and include 48 acres of foredune restoration, 4.2 acres of back dune restoration, and 2 20-acres blocks of temporary wind fencing.

previously developed by the District to the recent data,[10] we find that wind event PM_{10} levels at CDF have been steadily decreasing for the January 1 – June 28 period. Relative to 2017, 2018 levels were 13% lower, 2019 levels were 25% lower, and 2020 levels are 33% lower. These decreases are attributed to the mitigation measures on the dunes and are not simply an artifact of meteorology. In other words**, after accounting for changing winds, dust levels at CDF this year are 33% lower during wind events than they would have been without the mitigations.**

Q4: What role does silica play in the dust issue?

A4: Respirable crystalline silica is an occupational health hazard regulated by OSHA. District studies have shown that downwind of the ODSVRA the amount of respirable crystalline silica in the air is below the OSHA standard and that chronic risk is likely to be negligible. Prior to completing these studies, the District had concerns that there may have been a crystalline silica issue; however, none of our regulatory actions were based on concerns over respirable crystalline silica, and none required any findings related to silica. The District has acknowledged the study results in several public forums, including at the hearing to adopt the Stipulated Order of Abatement, which is the agreement prescribing the mitigation requirements currently underway. Instead, all District actions have been based on the long and very well-documented history of PM_{10} exceedances observed downwind of the ODSVRA. $PM_{10,}$ regardless of what it is made of, is a health hazard because of its small size.

To address the silica issue, the District collected 8 samples for respirable crystalline silica analysis in 2017 and 2018, and 26 additional non-respirable silica samples in 2019. The results of the studies were included in the 2017 and 2018 Annual Air Quality Reports,[10] presented to the District Board in November 2018 and November 2019, and discussed at the May 2019 public workshop on the ODSVRA Particulate Matter Reduction Plan.

Respirable crystalline silica was detected in 6 of the 8 samples from 2017-2018, and crystalline silica was detected in all but 5 of the 26 samples from 2019. None of the samples exceeded the OSHA standard and an estimate of the annual average silica level did not exceed the California's risk level for chronic exposure.

The District is aware of claims that the initial sampling results were hidden from the public or not disclosed in a timely manner, but this is not true. It takes time to collect samples, understand and analyze data, and then finally write reports which put the findings in the appropriate context; this is the usual process for any special study. In 2017, the District was still in the data collection phase of the process, when, in good faith, we shared early results with a partner agency. That agency later passed those initial results onto other parties and published them online without the District's knowledge or consent.

[10] SLO County APCD, "2018 Annual Air Quality Report," November 2019, available online at https://storage.googleapis.com/slocleanair-org/images/cms/upload/files/2018aqrt-FINAL.pdf

Appendix: Top 10 Tables

CDF 10 Top 10

Table A1: 10 Highest 24-hr PM_{10} Averages at CDF (ug/m^3) (through June 28)					
2020	2019	2018	2017	2016	2015
91	100	115	145	143	149
81	100	108	138	125	141
77	97	105	130	122	130
73	96	95	130	116	129
73	88	93	122	111	119
72	86	93	111	107	104
71	83	90	111	105	101
71	79	90	108	95	99
68	76	88	108	95	94
67	71	86	106	91	94

Table A2: 10 Highest PM_{10} Daily Maxima at CDF (ug/m^3) (through June 28)					
2020	2019	2018	2017	2016	2015
394	477	387	713	554	642
380	465	371	542	511	588
326	443	362	527	486	578
296	386	362	510	486	556
272	382	353	481	481	535
269	378	352	478	455	517
265	372	339	478	453	504
255	368	338	447	441	482
252	355	336	445	411	469
248	333	333	432	386	426

Mesa2

Table A3: 10 Highest 24-hr PM_{10} Averages at Mesa2 (ug/m^3) (through June 28)					
2020	2019	2018	2017	2016	2015
111	104	124	95	104	122
100	93	103	92	100	121
100	89	95	91	99	118
97	89	86	85	94	94
85	82	82	85	89	92
82	78	74	85	86	86
81	75	73	82	85	84
77	73	73	81	84	83
75	68	71	75	82	79
75	62	68	72	78	78

Table A4: 10 Highest PM_{10} daily hourly maxima at Mesa2 (ug/m^3) (through June 28)					
2020	2019	2018	2017	2016	2015
560	455	390	610	469	509
388	407	363	478	424	503
371	378	361	386	412	459
362	370	335	369	387	452
340	311	329	368	367	399
334	311	283	365	330	389
331	301	258	353	325	377
323	291	257	333	311	368
307	282	250	317	309	340
301	281	250	314	306	311