



DEPARTMENT OF PARKS AND RECREATION

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Memorandum

An Analysis: May and June Wind Strength Year to Year and State PM10 Exceedances with and without OHV Recreation, Oceano Dunes SVRA.

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From:

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Background

Since March 28, 2020, due to coronavirus concerns, off-highway vehicle (OHV) recreation has been prohibited at the Oceano Dunes State Vehicular Recreation Area (Oceano Dunes) in south San Luis Obispo (SLO) County California. Oceano Dunes remains closed to OHV recreation due to concerns related to endangered and threatened shorebirds.

The SLO County Air Pollution Control District (APCD) has suggested that OHV recreation causes the dune saltation process to be enhanced in some way, leading to more dust that blows downwind—an additional amount of dust beyond what is emitted naturally from the dune saltation process. As yet, the OHV-enhanced saltation value and related added dust amount has not been determined by the APCD nor by the Scientific Advisory Group (SAG), a collection of advisors and scientists formed as a result of the May 2018 Stipulated Order of Abatement (SOA) issued to DPR by the APCD.

A commonly expressed idea to determine if OHV recreation truly does increase saltation-generated dust downwind of Oceano Dunes is to prohibit OHV use for a period of time to see what happens. The coronavirus shut down of Oceano Dunes has created that opportunity.

The closure to vehicles has allowed for an examination of changes in the emission of saltation-generated dust from the dunes that may be due to the absence of OHV recreation. It is for this reason that the Desert Research Institute (DRI), consultant to the California Department of Parks and Recreation (DPR), has been conducting weekly testing of dune surface dust-emissive potential within Oceano Dunes. Thus far, DRI has not provided any preliminary findings from the testing.

But in the context of the SOA, which requires that violations of the state PM10 standard recorded downwind of Oceano Dunes be reduced, comparing the number of PM10 violations by specific month in any given year offers a simple metric.

A local news publication did such a comparison for the month of May and found that in May 2020, when there was no OHV recreation, there were more violations of the state's PM10 standard than for the same month in the previous six years

(<https://calcoastnews.com/2020/05/coronavirus-shutdown-shows-dust-on-the-nipomo-mesa-science-is-flawed/>).

The violations were recorded at the APCD's CDF and Mesa 2 air monitoring sites located on Nipomo Mesa (Mesa), approximately two miles downwind (easterly) of Oceano Dunes.

In an attempt to explain this unanticipated finding, the APCD posted a Frequently Asked Questions (FAQ) document to its website (<https://storage.googleapis.com/slocleanair-org/images/cms/upload/files/June2020FAQ-42.pdf>). The second question in the document reads, "Why have there been more exceedances [of the state's PM10 standard] in 2020 than by this point last year?" In answer the APCD states, "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."

This claim is based on wind data recorded at the CDF site on the Mesa. For individual years from 2015 through 2020, data from January through June were combined to represent spring wind speeds for a respective year.

However, that comparison is not germane to specific months when, in 2020, there was no OHV recreation at Oceano Dunes. Also, the comparison does not represent "a very windy spring" since the comparison uses data from January, February, and the first half of March. In other words, the first half of 2020 may indeed be the windiest half-year of the last six years, but that does not necessarily mean May 2020 has been the windiest May of the last six years.

Examining wind speed in May, and to a lesser extent, June, is more relevant because these are the months, in any given year, when the most violations of the state PM10 standard have been recorded. It is for this reason the SAG, in conducting SOA-required computer modeling of dust emission, uses wind and PM10 data recorded from May and June 2013 to inform their computer model.

Analysis

To that end, here is an examination of the APCD's CDF wind speed data from May and June for the years 2013 through 2020. The purpose of this data analysis is to determine which year had the windiest May and the windiest June, and if those windiest months in a particular year recorded the most violations of the state's PM10 standard.

The CDF site records hourly resultant wind speed in miles per hour (mph) and wind direction (the direction the wind is coming from). Days on the Mesa when elevated concentrations of PM10 are recorded coincide with strong prevailing winds from the northwest. The winds occur seasonally, predominantly in the late spring. The winds build in strength daily, beginning in the late morning, peaking in mid to late afternoon, and calming by early evening. Accordingly, to make this examination relevant to high PM10 recorded on the Mesa, the wind data were culled based on wind speed, wind direction, and time of day: Only data for winds above 5 mph, coming from the northwest quadrant, recorded between the hours of 11:00AM and 7:00PM were used for the analysis.

Hourly wind speed for each day from those segregated data were then added up and averaged. Those daily averages were then used to calculate the monthly wind speed average for each May and June from 2013 to 2020. Additionally, the recorded state PM10 violations for

May and June of each year were tallied to determine if wind speed and lack of OHV recreation in 2020 correlated with the number of PM10 violations.

Results and Discussion

The results are summarized in the table below.

Wind Speed and State PM10 Exceedances Recorded at CDF for May and June, 2013 to 2020					
<i>May</i>			<i>June</i>		
Year***	Averaged Wind Speed (mph)**	Exceedances of State PM10 Standard	Year***	Averaged Wind Speed (mph)**	Exceedances of State PM10 Standard
2013	10.529	20	2017	9.012	9
2014	10.036	19	2018	8.787	9
2015	9.842	5	2015	8.715	5
2019	9.391	6	2014	8.627	6
2016	9.376	4	2020*	8.615	7
2020*	9.375	12	2016	8.602	10
2018	9.351	9	2013	8.464	7
2017	9.123	10	2019	7.834	2

*No OHV recreation occurring within Oceano Dunes SVRA.

**Wind speed averages determined using data for winds above 5 mph, coming from the northwest quadrant, recorded between the hours of 11:00AM and 7:00PM.

***Ordered from most to least windy years.

Most broadly, the CDF data show northwest winds are stronger in May than June, an expected result.

Regarding May, averaged northwest wind speeds year to year show variability within 1.4 mph. May 2013 had the highest average wind speed (10.05 mph), and May 2017 had the lowest wind speed (9.12 mph). May 2020 wind speed (9.38 mph) was the third least windy May of the eight years examined. Additionally, May 2020, when no OHV recreation occurred in the dunes, had the most violations of the state’s PM10 standard (12) since 2014.

For June, averaged northwest wind speeds year to year show variability within 1.2 mph. June 2017 had the highest average wind speed (9.01 mph), and June 2019 had the lowest (7.83 mph). June 2020 wind speed (8.61 mph) was the fourth least windy June of the eight years examined. In comparing violations of the state’s PM10 standard year to year, June 2020, with no OHV recreation in the dunes, recorded 7 violations. The most violations were recorded in June 2016 (10), which was the third least windy June (8.60 mph) for the eight years examined.

It should be noted that since 2017, DPR has installed approximately 230 acres of saltation-reducing treatments in the dunes. Most of these treatments consist of planted dune vegetation, and most have been in the OHV riding area of Oceano Dunes. Despite this effort, despite that May and June 2020 were less windy than most other years going back to 2013, and despite that there was no OHV recreation occurring at Oceano Dunes, the number of violations of the state's PM10 standard, particularly in May 2020, appears exceptionally high. It appears the geologic processes of the dunes system, in the broader context of the dust concentrations measured on the Mesa, are far from understood. Accordingly, attempts to accurately assign those recorded dust concentrations to a specific recreational activity within a specific area of the dunes are premature at best and may even be unachievable.

Conclusions

The review of the data shows that northwest wind speeds in May 2020 and June 2020 were not exceptionally elevated. In fact, May 2020 and June 2020, respectively, had lighter winds than most of the correlating months and years examined. From these data, the months of May and June in 2020 were not very windy.

Additionally, the comparatively lower wind speeds of May 2020 and June 2020 do not correlate to the high number of state PM10 violations concurrently recorded during these months in 2020, when OHV recreation was not present. This finding is at odds with the referenced APCD FAQ document that stated, "more exceedances [of the state PM10 standard] are expected in a windier year than in a less windy year." This may be because the APCD analysis to determine the strength of spring winds year to year as a means to explain PM10 exceedances in 2020 incorporates data from months that are not in spring (January, February, the first half of March), and does not consider the specific months in 2020 when there was no OHV recreation occurring in the dunes.