Air Pollution Control District
San Luis Obispo County

Response to Comments on the May 1st Workshop Version of the Draft Particulate Matter Reduction Plan Required by Stipulated Order of Abatement 17-01

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Introduction

As required by Stipulated Order of Abatement Number 17-01 (SOA) between the San Luis Obispo County Air Pollution Control District (APCD or the District) and the California Department of Parks and Recreation (Parks), Parks submitted a revised Draft Particulate Matter Reduction Plan (DPMRP) to the Air Pollution Control Office (APCO) on March 28, 2019. Also as required by the SOA, a workshop was held on May 1, 2019, to solicit public comment. Written comments were accepted from April 1 through May 15, and in person at the May 1 workshop. In total, 39 hand-written comments and over 200 pages of emailed comments were received. The SOA, DPMRP, all public comments, and a variety of related documents are posted on the District's website at https://www.slocleanair.org/air-quality/oceano-dunes-efforts.php.

All comments are being considered by Parks, the District, and the Scientific Advisory Group (SAG). While not required by the SOA, we have compiled this Response to Comments document to address many of the common themes and questions raised in the comments. It is not our goal to respond to each and every point; rather, we are providing general responses to the most common and/or most substantive issues that were raised.

Nature and Source of the Dust

Many commenters had questions about how and where the dust is generated. The goal of this section is to answer these questions and correct common misconceptions.

The high dust levels on the Nipomo Mesa are caused primarily by windblown sand in the dune areas, which releases mineral dust PM_{10} from the surface.

Sand moved by wind is termed "saltation," which describes the hopping of the sand grains as they move under the force of the wind. This process (i.e., saltation) is the primary mechanism for PM_{10} generation within the ODSVRA sand sheet areas. The generation of dust by saltation has been documented in many studies, most recently by Huang et al. (2018) at the ODSVRA. Under high winds, sand grains briefly become airborne. When these lofted sand grains fall back to the surface, their impacts cause the release of PM_{10}-sized particles, which are then transported by the wind. **Since the wind drives saltation, high PM_{10} levels on the Nipomo Mesa correlate strongly with high winds from the WNW.** This relationship is visualized in several APCD reports, including the 2007 "Phase 1 Study" (Figures 28 and 29), the 2010 "Phase 2 Study" (Figures 3.15, 3.16, 3.25, 3.26, 3.31, 3.32, and 3.53), Appendix B of the *2012 Annual Air Quality Report*, and Appendix B of the *2013 Annual Air Quality Report*. All of these reports are available on the district website at https://www.slocleanair.org/library/air-quality-reports.php.

Rooster tails and tail-pipe emissions are not significant contributors to PM_{10} on the Nipomo Mesa.

Off highway vehicles (OHVs) release tail-pipe emissions and often generate "rooster-tails" as they traverse the dunes. The contribution of these potential sources to downwind PM_{10} is limited, and under high winds any contribution from active vehicle movement is swamped by saltation-derived dust. If either of these sources were a significant problem, then ambient PM_{10} levels would be expected to correlate with the amount of OHV-activity on the ODSVRA; however, they do not. This was investigated in the District's Phase 1 and Phase 2 Studies, as described below.

The Phase 1 Study (pp. 33-36) compared downwind PM_{10} levels between weekdays and weekends, since OHV activity increases on the weekends. It found small but inconsistent differences and concluded that "activity at the Oceano Dunes Park could be causing measurable air quality impacts on the Mesa. However, the conflicting data from Ralcoa [a previous monitoring station near the present-day CDF station], as well as the possibility that other weekend/weekday activity patterns may be influencing this analysis, make this conclusion quite tentative."

The Phase 2 Study includes a plot (Figure 3.64) of the daily number of vehicles entering the ODSVRA versus Mesa2 PM_{10} concentrations and states "the data shows no statistical correlation between the two. This is not surprising given the predominant role of wind speed and direction in determining PM_{10} concentrations." This study also compared the average PM_{10} concentration of the 50 days with the most vehicles entering the park to the average of the 50 days with the fewest entries (pp 3-52 – 3-53). This part of the analysis may not valid, since vehicle entries are likely to vary seasonally and correlate with weather (e.g., the Park's off-season is the winter, which tends to be less windy than the spring). The analysis found a weakly significant difference between PM_{10} levels at Mesa2 (with higher levels on the highest traffic days) but no significant difference at CDF or the Oso site, and it concluded that: "The mixed message from this analysis shows that the direct emissions impacts of vehicle activity on the SVRA, even if statistically measurable, are small compared to the indirect impacts caused by OHV activity increasing the ability of winds to entrain sand particles from the dunes and carry them to the Mesa."

OHV-activity increases the emissivity of the dunes.

How is OHV-activity causing the PM_{10} problem on the Nipomo Mesa if saltation is the primary mechanism for dust generation and OHV tailpipe emissions and "rooster tails" are not significant contributors? One way is through the loss of vegetation, which exposes more open sand sheet which is the source area for dust caused by the wind-blown sand. Vegetation is highly effective at arresting saltation. Even in a less-than-fully-vegetated condition, sand cannot be moved effectively by wind and hence can be rendered non-emissive. As discussed later in this document, there is evidence that OHV activity has caused the loss of vegetation that would otherwise exist in the ODSVRA, thus increasing the area where saltation can occur.

The second way OHV-activity contributes to elevated PM_{10} levels is by increasing the emissivity of open sand sheets. In this context, "emissivity" means the amount of PM_{10} generated per unit area at a given wind speed. Under identical wind conditions, more PM_{10} is emitted from a higher emissivity area than from a lower emissivity area. Two studies have directly investigated the emissivity of dunes surfaces in a variety of locations within the ODSVRA. The "PI-SWERL study" (DRI, 2014a, available as State Parks Exhibit 53 at https://www.slocleanair.org/who/board/hearing-board/actions.php) measured emissivity in more than 300 locations in and adjacent to the ODSVRA. It found that areas where OHV activity is allowed are more emissive than non-riding areas by an average factor of 2.4 at the highest wind speed tested, and 5.2 at lowest wind speed. A follow-up study (DRI, 2016, available as State Parks Exhibit 64) found that opening a non-riding area to OHV-activity, "results in increased emissions by roughly a factor of 2 to 3." It is clear from these studies that OHV activity increases emissivity; however, it remains unclear how it does so.

Finally, studies have compared ambient PM_{10} levels measured directly downwind of riding areas to measurements made downwind of non-riding areas. The Phase 2 Study and DRI (2014b) both found areas downwind of riding areas have higher PM_{10} levels than non-riding areas during wind events.

What about other potential sources, like roads, sea salt, and construction?

The District has thoroughly investigated other potential sources that could, in theory, cause the high PM_{10} levels on the Nipomo Mesa. The contribution of sea salt was investigated in the Phase 1 and 2 Studies as well as the South County Community Monitoring Project. Agricultural emissions and sulfate- and ammonium-based aerosols were investigated in the Phase 1 and 2 Studies; refinery emissions in the Phase 2 Study; and dirt roads in the Phase 1 Study. All of these sources were ruled out as major contributors to the high PM_{10} levels on the Nipomo Mesa. In addition, the Phase 1 and 2 Studies analyzed dust samples collected during high wind/high PM_{10} events and found they were predominantly composed of crustal material. All of these reports are available online at https://www.slocleanair.org/library/air-quality-reports.php.

In addition to District's studies, one other recent study (Huang et al., 2018) also analyzed dust samples from the ODSVRA. This study found the contribution of sea salt was low during windblown dust events.

Many commenters suggested that construction sites on the Nipomo Mesa could be responsible for the elevated PM_{10} levels there; however, any construction sites are *downwind* of the District's PM_{10} monitors during windblown dust events. As noted in the *2017 Annual Air Quality Report* (online at https://www.slocleanair.org/library/air-quality-reports.php), under other infrequent meteorological conditions, construction dust has likely contributed to elevated PM_{10} levels at Mesa2, including the highest 24-hour PM_{10} value recorded in 2017.

Finally, some commenters suggested that local traffic on Highway 1 might be the cause, but this is unlikely as other PM_{10} monitors throughout the country are closer to more highly trafficked roadways, but do not measure PM_{10} levels nearly as high. For example, the PM_{10} monitor in San Luis Obispo is 50 meters from South Higuera Street, which has an annual average daily traffic count (AADT) of 15,731. It exceeded the state PM_{10} standard 4 times in 2017. CDF is 53 meters from Highway 1, which has an AADT of 7,100, yet it exceeded the standard 97 times that year.

Marine biological aerosols are not significant contributors to PM_{10}.

Many commenters mentioned the "Scripps Study" and the possibility of marine biological material being a major contributor to the high PM_{10} levels on the Mesa. This study (Palentik, 2018, available on Parks' website at http://ohv.parks.ca.gov/?page_id=1207) is addressed in the District's Preliminary Review Letter for the February 21 version of the DPMRP. (The letter is online at online at https://www.slocleanair.org/air-quality/oceano-dunes-efforts.php; the relevant section begins on page 9). As discussed in greater detail there, it is very unlikely that marine aerosols contribute significantly to the high PM_{10} levels observed at CDF and Mesa2 during windblown dust events. This is because:

- The study did not quantify the mass contributed by the aerosols to the PM_{10} samples that were analyzed. DNA can be detected in vanishingly small quantities, so merely detecting it does not imply that biological material is present in significant quantities.
- As noted above, previous studies have analyzed dust samples collected during windblown dust events and found that they are composed primarily of "crustal materials" consistent with being derived from sand.
- Marine aerosols constituting a significant fraction of PM_{10} mass is not consistent with the observed spatial patterns of ambient PM_{10}.
- Finally, we know of no evidence from anywhere in the world of marine aerosols causing PM_{10} concentrations like those routinely seen downwind of the ODSVRA.

There is a natural component to the high PM_{10} levels on the Mesa.

Saltation is a natural process, driven by wind, and the emission of dust during saltation on sand dunes is well-documented (e.g., Bullard et al., 2007; Crouvi et al., 2012; Huang et al., 2018). As noted above, OHV activity has increased the extent of bare sand upwind of the Mesa, and it increases the emissivity of bare sand; however, even in the complete absence of OHV-activity, elevated PM_{10} levels would still sometimes occur on the Nipomo Mesa. For example, the Oso Flaco PM_{10} monitor is located within the ODSVRA, downwind of area that has been closed to riding for more 30 years. In 2017, when the CDF monitor recorded 97 exceedances of the state PM_{10} standard, Oso Flaco recorded 12 exceedances.

Crystalline Silica

Many commenters mentioned crystalline silica and questioned whether ambient levels downwind of the ODSVRA pose a health risk. Generally, beach sand has a high quartz content, and quartz is a form of crystalline silica. Since the PM_{10} impacting the Nipomo Mesa is derived from ODSVRA sand, it is reasonable to wonder whether crystalline silica is present in this dust, especially since respirable crystalline silica is known to cause lung cancer, silicosis, COPD, and kidney disease.

It should also be noted that the most adverse conditions where crystalline silica is a health risk are usually associated with industrial processing of sand, or in areas with the uncommon minerals cristobalite and tridymite that can be weathered and become susceptible for entrainment by the wind. Such conditions are not known to exist at ODSVRA; nonetheless, the District is performing studies to assess respirable crystalline silica levels. The presence of crystalline silica alone does not necessarily imply a health risk; it must be present in specific respirable forms and in sufficient quantities to cause negative health effects.

In 2017 and 2018, the District collected eight air samples for respirable crystalline silica analysis. All samples were collected at the CDF monitoring station during windblown dust events when 24-hour PM_{10} levels exceeded the state PM_{10} standard. As discussed in detail in Appendix B of the *2017 Annual Air Quality Report* (online at https://www.slocleanair.org/library/air-quality-reports.php) none of these samples exceeded the OSHA workplace standard (8-hour average of 50 $\mu g/m^3$), but respirable crystalline silica was detected in six of them, with a maximum concentration of 20 $\mu g/m^3$ for a 6-hour average sample.

The District had questions about the sampling efficiency of the method used in 2017 and 2018, and therefore has undertaken additional sampling in 2019 using a different method. At the workshop, the District disclosed that 4 samples had been analyzed so far, and none exceeded the OSHA standard.

A report will be issued once sampling and analysis has been completed, likely in late 2019. This report will compare the observed silica concentrations to relevant standards and reference exposure levels, including the OSHA standard and the California Office of Environmental Health Hazard Assessment's (OEHHA) chronic reference exposure level (REL) of 3 $\mu g/m^3$. (The OEHHA REL assumes exposure a over a significant portion of a lifetime and will be compared to an estimate of annual average crystalline silica concentration for the Mesa. It is not appropriate to compare individual short duration samples to a chronic REL.)

Parks also collected dust samples for respirable crystalline silica analysis in 2017 and 2018. In contrast to the District's sampling, Parks collected samples on calm, non-windblown dust event days,

when ambient PM_{10} levels were low. No silica was detected in these samples. These results are available on Parks' website at http://ohv.parks.ca.gov/?page_id=1207. Parks is collecting additional samples in 2019.

Finally, a recent study (Huang et al., 2018) found that compared to other West Coast beaches, the sand at Oceano has "substantial clay-mineral coatings" and a relatively high content of feldspars, which are aluminosilicate minerals. The local prevalence of feldspars in the dune sands is likely due to the influence of the nearby Santa Maria river, transporting feldspar-rich particles eroded from rocks and sediments inland and depositing them offshore where they can be delivered to the beach by wave action. Feldspar is softer than quartz, and more easily broken down when saltation occurs. This suggests that saltation derived PM_{10} should have significant proportions of feldspar particles and relatively low proportion of quartz particles, which is consistent with the results of the silica sampling noted above.

APCD Emissions Inventory

Some commenters questioned why the District's official emissions inventory does not account for windblown dust from the ODSVRA. (See https://www.slocleanair.org/library/emissions-inventory.php for a description of the inventory.)

The District compiles an annual emissions inventory in order to comply with state and federal regulations. For most emissions sources like diesel engines, gas stations, landfills, power plants, wineries, etc., there are standard emissions factors that are set by the EPA and the California Air Resources Board. The District uses these emissions factors in compiling the emissions inventory.

The ODSVRA is a unique source, and there is no standardized methodology for calculating its emissions. The District is not obligated by existing regulation to include it in its inventory, and thus far has not. The District is permitted to develop its own emissions factor for the ODSVRA and plans to do so as resources become available. However, having such an emissions factor in hand would not change the understanding of the PM_{10} issue on the Nipomo Mesa, nor would it affect the District's regulation of the ODSVRA. As discussed previously, it is known that during windblown dust events, the ODSVRA is the source of the PM_{10} measured at the CDF and Mesa2 monitoring stations, and that OHV-activity contributes to increased emissivity of PM_{10} from the sand. The exact mechanism (or mechanisms) by which OHV activity affects emissivity has yet to be determined.

Air Quality Model

The model is very accurate, but it can be improved.

As described in the DPMRP, a dispersion model has been developed by DRI to inform the design of the ODSVRA dust mitigations. Many commenters questioned the accuracy/suitability of the model,

and some even cited the District's and/or the SAG's comment letters (both available at https://www.slocleanair.org/air-quality/oceano-dunes-efforts.php in the "February 25, 2019 Update" section), which noted limitations of the model and recommended ways to improve it.

As noted in the DPMRP and described in more detail Attachment 2 to the DPMRP, the DRI emissions and dispersion model shares much under-lying physics with the CARB model. For example, both use the wind field-generating model CALMET. The difference between the models is primarily the choice of the dispersion component (i.e., how the particles move downwind with the turbulent air) and the spatial resolution. The DRI model operates at a significantly higher spatial resolution (i.e., 20-meter grid cell size) than the CARB model. Both the SAG and CARB have endorsed its use to provide accurate estimates of PM_{10} at receptor sites; however, its performance can be improved. Notably, the emissivity and meteorological data that are currently used are from the spring of 2013. Incorporating recent data collected with a network of meteorological and particulate matter measurement instruments will refine the model and produce more accurate results. New emissivity data are being collected in 2019 using the PI-SWERL method, and a network of 15 meteorological measurement stations was deployed in May 2019. These data will be used to improve the wind field and dispersion components in the model allowing for a more accurate evaluation of the impact of different source areas within the ODSVRA on PM_{10} levels at CDF and Mesa 2. This should help Parks fine tune its mitigation strategy by identifying and prioritizing areas for dust control. **In short: the model is accurate enough to inform mitigation planning and will benefit from further refinement.**

What is the appropriate baseline for emissions reductions?

In modeling the effects of various mitigation scenarios on PM_{10} emissions and downwind PM_{10} concentrations, the DPMRP uses 2013 as a baseline year. It first looks at the ambient PM_{10} levels from CDF and Mesa2 and the calculated emissions from the ODSVRA. Then, for each mitigation strategy, it models the impact on emissions and ambient PM_{10}. The year 2013 is used for two reasons: 1) the SOA requires the use of this specific year, and 2) this is the only year (to date) with a dense-enough network of meteorological and emissivity (i.e., PI-SWERL) measurements to support the development of a model.

The SOA specifically called for using "maximum 24-hour PM_{10} baseline emissions", i.e., comparing all mitigation scenarios using the meteorology from the one day during the modeled period that had the highest emissions. This day was May 22, 2013. The DPMRP follows this requirement but noted that "focusing dust remediation efforts within [the area of highest emissions as indicated by the model] would most effectively result in a reduction of PM_{10} concentration at CDF, *provided meteorological conditions are near-identical to those that occurred on May 22, 2013* [emphasis added]." Because of this, the DPMRP recommended using the top 10 most emissive days rather than focusing

on the single highest day. In their comment letters, both the SAG and District tended to agree with this.

The 2013 drought does not bias the model.

Some comments pointed out that 2013 was a drought year and suggested that this makes it an inappropriate choice for the baseline. While 2013 was unusually dry overall, this is not likely to have affected PM_{10} emissions from the ODSVRA, for the following reasons:

- As defined by the SOA, baseline period is May 1 through August 31, 2013. Even for "wet" years, there is typically little rain in this area during these months. According to records maintained by the Santa Barbara County Flood County District (available at https://www.countyofsb.org/pwd/monthlyrain.sbc), for the period of May 1 to August 31, precipitation totals for 2013 do not differ much from other years. The table below shows the data for Guadalupe, CA:

Year	Total Rain, May 1 – August 31 (Inches)
2018	0.00
2017	0.34
2016	0.03
2015	1.10
2014	0.01
2013	0.16

- Even more days exceeded the state standard at CDF in 2017 (97) than in 2013 (93); other years were drier than 2013 yet had fewer exceedances.
- While dust generation is suppressed during active precipitation, the effect is not expected to have much lingering impact on emissivity once the rain stops. This is because saltation occurs at the surface of the dune, which dries out quickly after precipitation since it is very porous and is exposed to direct sunlight and drying winds.

One commenter noted an academic study (Achakulwisut, 2018), which linked increased $PM_{2.5}$ levels in the U.S. Southwest with decreased precipitation, but this study is not relevant to the windblown PM_{10} issue on the Nipomo Mesa. Windblown fine particulate emissions in U.S. Southwest deserts increase during periods of drought due to reductions in soil moisture content and vegetative coverage. Neither of these phenomena are likely to occur at Oceano Dunes as relative humidity—and the resulting soil moisture content—is maintained at relatively constant levels due to proximity to the ocean, and emissive portions of the dunes are constantly replete of vegetation.

The PI-SWERL emissivity measurements were conducted properly.

One commenter questioned whether the PI-SWERL emissivity measurements (DRI 2014a and 2016), which form the basis of the emissions part of the model, were analyzed properly. In particular, the commenter questioned whether the measurements were conducted in accord with the recommendations of an academic paper, Etyemezian et al. (2014). We asked the paper's primary author, Vic Etyemezian (who is also the primary author of PI-SWERL studies cited above), to respond:

> *"Portions of the riding area that are very near the shoreline are aerodynamically rough because vehicles, including campers and trucks, drive on partially wet sand that maintains the imprint of their tires. PI-SWERL measurements cannot be conducted on such surfaces because the grooves in the sand are too deep and wet. However, slightly further from the shore, the top few inches of the surface is composed of dry sand and the imprints made by OHV tires are relatively shallow. There is sparse debris and sometimes windblown trash that can be found, but this constitutes a very small portion of the surface. The roughness in these areas is essentially that of a sandy surface and this is the same as the roughness in areas with less traffic as well as in areas where riding is prohibited. Therefore, the use of the same roughness value in interpreting PI-SWERL measurements is reasonable given other uncertainties and variables."*

Dune Vegetation and Restoration

Vegetation within the ODSVRA has been impacted by OHV-activity.

There will always be some uncertainty about what the Dunes looked like before OHV-activity began, or what the Dunes would look like today if there had never been OHV-activity, but vegetation within and around the present-day ODSVRA has obviously been impacted by human activity. In some areas, natural vegetation has been reduced by human activity, including OHV activity; other areas have been overrun with non-native and often invasive species; still other areas, which may have been naturally sandy in the past, have been intentionally vegetated (often with native species, but not always).

It is clear that there were once foredunes within the present-day riding area. They are present in aerial photos from the 1930's (see DPMRP Attachments 4 and 5); they are present today in the areas immediately to the north and south of the riding area; they are present in similar dune systems in other locations; and incipient foredunes have formed in the Plover Exclosure area, which is seasonally closed to OHV-activity. This loss of vegetation and the slowing of sand movement through a foredune complex is significant for dust generation, which is why foredune restoration is a key recommendation of the SAG.

Historical aerial photography is informative.

At least one commenter questioned the use of historical aerial photography for discerning how the Dunes have changed over the years. The aerial photographic record goes back to the 1930s; however, the history of vehicular activity on the Dunes goes back even earlier. Limited as it is, the photographic record is informative. As already noted, it provides evidence that foredunes once existed in what is now the riding area of the ODSVRA. Analysis also shows a net loss of 79 acres of vegetation in the riding area of the Park between the 1930s and today (DPMRP Attachment 4). A comparison of photos from 1985, shortly after the Park was established, to 2005, shows the loss of foredunes even over that narrower timeframe. New vegetation was only found in areas where OHV-activity is excluded by fencing. (CGS, 2007).

The goal is not to restore the Dunes their "natural" state.

A previously noted, it is impossible to know precisely where vegetation existed on the Dunes prior to the area being used for vehicular activity. This does not present a problem, however, since restoring the Dunes to their natural state is not the goal of the project. Rather, the goal is the mitigation of windblown dust. Establishing vegetation on bare sand is a very effective method for mitigating sand movement and the accompanying windblown dust, and has thus become the focus of the DPMRP, but it is not necessary to recreate the previous state of the system for it to be effective.

The intent of the dune restoration is to plant the least amount of vegetation possible in the locations where it has an optimum chance of both surviving and of controlling emissions.

A number of commenters questioned various aspects of the restoration efforts undertaken so far and planned for the future. The intent of these efforts is to plant the least amount of vegetation possible in the locations where it has an optimum chance of both surviving and controlling emissions. Plant survival is informed by analysis of historical aerial photography and examination of nearby present-day dune systems. Effectiveness for emissions reduction is informed by modeling. Both indicate that adding self-sustaining vegetation offers the best chance for success and preserves the most area for continued OHV-activity.

The SAG recommends restoration with regionally sourced native vegetation.

Some commenters referenced on-going planting with non-native vegetation, but we believe these commenters are mistaken: To date, all dust-mitigation-related planting has been done with locally sourced native plants.

With regard to the plant palette for future restoration efforts, SAG recommends continuing to use locally sourced native species, with one exception: searocket (*Cakile maritima*). The SAG notes that

searocket is not a native species, but it has been thoroughly naturalized in this area, and performs a valuable ecological role in the establishment of incipient dunes. It is very common in foredunes of the Central Coast, and it is not considered to be either invasive or a threat to any local habitats. It is the opinion of the SAG, reinforced by the opinion of the Parks revegetation expert, that this species should be used in the Foredunes.

The SAG also recommended that "locally sourced" means that the seeds used to generate container plants comes from coastal dune systems in central California. If not directly from the Oceano Dunes, material from dunes fields to the north and to the south of Oceano can produce locally adapted seeds that have high potential of pre-adaptation to the Oceano Dunes conditions.

There are practical limits on how quickly dune restoration can occur.

Many commenters questioned why revegetation is not proceeding more aggressively. Without additional resources, there are limits to how many container plants can be grown and installed in one year. Although the capacity of commercial growers may be large, the less expensive options of growing plants at the State Parks facility and at Cal Poly are constrained in number due to space. Collection of seed is also expensive and time-consuming. When the Work Plan for the dust control project is written and approved, and a Project Manager is retained, resources may be able to be developed for a more aggressive revegetation effort, accelerating the rate of both container plant development and plant installation. Furthermore, during seasons where rainfall is limited, plant survivorship and growth is more limited than during seasons of ample rainfall.

One commenter suggested transplanting mature plants from the Dune Preserve, existing vegetation islands, and elsewhere to areas where restoration/revegetation is needed for dust control. Transplantation of mature plants is an endeavor with a much higher level of effort and risk of failure than the introduction of properly grown nursery stock. The success of the revegetation efforts to date in the Oceano dunes shows that the introduction of small nursery plants in areas that are stabilized with straw and/or sterile annual grasses yield good results in a cost-effective manner.

Legal Aspects

What is the approval process?

Many commenters had questions about the approval process for the DPMRP and annual workplans and how CEQA fits in. State Parks has proposed a Preliminary Concept Draft Particulate Matter Reduction Plan dated March 28, 2019. The Air Pollution Control Officer has approved the DPMRP subject to certain conditions. Mitigation efforts will be included in Draft Reports submitted to the APCO on or before August 1 of each year and will be subject to APCO approval. Some mitigations included may require Coastal Commission approval. The SOA then further specifies the timing to reach the air quality goals. The PMRP itself is not a project under CEQA. State Parks will take their

project through the CEQA process later this summer subject to regulatory process. For further details, see the PMRP approval letter available at https://www.slocleanair.org/air-quality/oceano-dunes-efforts.php.

Is the goal 50% reduction in emissions or attaining all standards?

The SOA explicitly requires a 50% reduction in the maximum 24-hour baseline emissions, based on air quality modeling. The SOA goes on to say that this emission reduction target may be modified based on air quality modeling subject to review by the SAG. At this time, the SAG has not proposed any modification of the 50% emission reduction target.

What about the removal of eucalyptus trees east of the ODSVRA?

Many commenters noted that acres of eucalyptus trees east of ODVSRA have been removed and housing developments have been built, with most questioning why this was allowed. Some commenters suggested re-establishing these trees as a mitigation measure.

The District does not have authority over land use decisions and did not have any role in the approval of these developments. While OHV activity on the Oceano Dunes predates these developments, from a legal standpoint, this does not matter. Under the law, no one may release air pollution in sufficient amounts as to cause a nuisance outside of their own property—the type of area impacted by the nuisance is irrelevant. In this case, it is a residential community that is impacted, but even if it were farmland or eucalyptus forest, the District would still have the authority and obligation to act, provided there was sufficient evidence to establish that a nuisance was occurring.

The removed trees most likely acted as a wind break for the area immediately downwind. It is less clear whether they provided any air quality benefit. They could not have had any impact on dust generation, since that happens on the Dunes, upwind where the trees once stood. Any air quality impact would have been via "filtering" dust from the air as it is blown through the trees (Raupach et al., 2001). It is uncertain what the efficacy of vegetative filtering might have been in this situation, as the effects of vegetation on ambient particulate matter are complex, and vegetative barriers must be carefully designed if they are intended to improve air quality (Janhäll, 2015).

Regardless of the possible air quality benefits of the lost eucalyptus trees, reestablishing them is impractical. Parks does not own or control the property where they once stood, and it would take decades to regrow them.

Other Potential Changes to the ODSVRA

The proposed southern entrance and campground are not part of the dust control mitigations.

Parks has initiated a Public Works Plan (PWP) for Pismo State Beach and the ODSVRA. This plan includes many proposed changes to the Park, including establishing a southern entrance and campground in the area near Oso Flaco Lake which is already owned by Parks but currently leased for agricultural use. Many comments were received on this proposal; however, it is not a part of the DPMRP and is a completely separate process. The APCD has no role in developing or approving this plan. Parks has established a website at https://oceanodunespwp.com/ for disseminating information about the PWP and collecting public input.

Parks will continue to explore opportunities to expand OHV opportunities.

A very common theme among the comments was that Parks should replace any acres of the riding area that are lost to dust control mitigations. It is our understanding that Parks will continue to explore opportunities to open areas to riding that are currently closed.

Miscellaneous Topics

Health studies from the Nipomo Mesa are not needed.

Some commenters noted that there have not been any studies investigating the health effects of the high PM_{10} levels on Nipomo Mesa residents. While it is true that there have been no studies in this specific population, there is a large and ever-growing body of evidence from around the world that demonstrates the adverse health impacts of particulate pollution. See, for example, the EPA website (https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm) or CARB's website (https://ww3.arb.ca.gov/research/aaqs/common-pollutants/pm/pm.htm). It is not necessary to re-demonstrate these health effects using this specific population before acting to reduce PM_{10} levels; in fact, doing so would only delay action and cause unnecessary harm.

Ample information exists to justify regulation and implement mitigations.

Another common theme among the comments was that the implementation of dust mitigations should be put on hold, and more data should be collected before acting. Many commenters felt excluding OHV-activity from additional acres was premature, since scientific studies and data collection are ongoing. Many cited the economic impact of the ODSVRA and their own personal experiences enjoying the Park as justification for delaying.

It is true that a variety of studies and data collection activities are ongoing and that the SAG recommended additional studies; however, it is also true that the dust issue has been investigated

for over a decade. The cause and the potential solutions are well known—further delays in reducing emissions are not in the public interest. The goal of the ongoing studies and data collection is to track progress in reducing emissions, refine the mitigation strategies, and address some unknowns like whether silica constitutes a significant portion of the emitted dust.

Finally, the SOA commits the parties to implementing dust mitigations. It was approved by the Hearing Board, and Parks and APCD must comply with it. Delaying action would therefore require going back to the Hearing Board and getting their approval.

The APCD is enforcing dust rules at other sources.

Many commenters noted fugitive dust from a construction site on the Nipomo Mesa and questioned whether the District was taking appropriate action against this source. The District has taken enforcement actions on constructions sources in the past, including on the Nipomo Mesa, and will continue to do so in the future.

Industrial wind fencing would not be effective.

The installation of industrial-style wind fencing east of the ODSVRA boundary, as suggested by one commenter, would not effectively filter the air of PM_{10} to reduce the levels to below the State standard. This type of fencing is used typically to protect a source area, such as a stockpile of erodible material, by shielding it from high winds. Once the PM_{10} becomes airborne and is dispersing (moving laterally and vertically) it is not plausible to place a filter-like array of materials to effectively remove the particles. A more effective strategy is to ensure the particles do not get emitted from the source areas.

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